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ABSTRACT

All second- and third-grade students in California public schools were tested in reading achievement, and all sixth and twelfth grade students were tested in reading, written expression, spelling, and mathematics. Second- and third-grade achievement gains were reported on the California Reading Assessment Program Reading Test over an eleven-year period. In a comparison of California pupil performance and national student performance, California's second- and third-grade students were determined to be at the 55th and 56th percentile ranks, respectively, compared to the national average. Comparison with 1975-76 California scores showed a slight decline in sixth-grade reading achievement and gains in written expression and mathematics. The same comparison for grade twelve showed a decline in all three achievement areas. Recommendations for instructional emphasis were included, as well as a subgroup analysis of achievement level by pupils, schools, and districts. Among the background factors considered were sex, English language fluency, occupation of family breadwinner, pupil mobility, entry level test scores, socioeconomic status, school size, type of district, and percent of pupils from families receiving aid for dependent children. California achievement levels are also compared with specific national test battery results. (Author/JAC)

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Student Achievement in California Schools

1976-77 Annual Report

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California Assessment Program

CALIFORNIA STATE DEPARTMENT OF EDUCATION • Wilson Riles, Superintendent of Public Instruction • Sacramento, 1977

California Assessment Program

Student Achievement in California Schools

1976-77 Annual Report

Prepared Under the Direction of
Alexander I. Law, Chief
Office of Program Evaluation and Research

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I. Summary of Findings

During the 1976-77 school year, all second-grade pupils (299,258) and third-grade pupils (284,712) in California public schools were tested in reading achievement. All pupils in grades six (310,843) and grade twelve (243,137) were tested in the basic skills of reading, written expression, spelling, and mathematics.

Grades Two and Three Results

Reading achievement test scores for second- and third-grade pupils have been improving steadily since statewide testing in those grades began in 1966. This trend has continued through 1977. Table 1 shows that the overall gain of second-grade pupils was .7 percent correct and that the overall gain of pupils in grade three was .3 percent correct. These gains reflect pupil performance on the California Assessment Program Reading Test, which was constructed specifically to assess the broad range of reading programs in California's public schools.

Special equating studies were conducted to determine the relationship of the performance of California pupils to the 1973 (the latest year from which comparable figures are available) performance of a sample of pupils across the nation. The median second- and third-grade pupils in California were determined to be at the 55th and 56th percentile ranks, respectively. In 1975-76 the median second-aand third-grade pupils were at the 54th and 55th percentile ranks, respectively.

Grade Six Results

All students in grade six took the Survey of Basic Skills: Grade 6, another test developed (in 1974-75) specifically for the California Assessment Program. Table 1 shows that the scores of California sixth-grade students improved in written expression and mathematics, declined slightly in reading, and remained the same in spelling. The gain in written expression (1.1 percent correct) was quite substantial, while the gain in mathematics (.3 percent correct) and the loss in reading (.2 percent correct) were somewhat less so.

The results of an equating study provided a basis for comparing California students with a national sample of students tested in 1973, the most recent year from which national norms were available. The median sixth-grade student in California is now above the 1973 national median in all areas. In reading the median sixth grader in California remained at the 53rd percentile. The median sixth-grade student moved from the 49th to the 51st percentile rank in written expression and from the 50th to the 51st percentile rank in mathematics.

Grade Twelve Results

All students in grade twelve took the same test that was administered in 1975-76--the Survey of Basic Skills: Grade 12. Table 1 shows that the scores in all four content areas declined in 1976-77. (This result follows an increase in 1975-76.) The greatest decline was in spelling, the smallest in written expression.

Equating studies conducted in 1974-75 provided a basis for comparing the performance of California twelfth graders with that of national norm samples tested in 1962 and 1970. On the basis of the 1962 norms, the median twelfth-grade student in California in 1976-77 was at the 42nd percentile rank in reading, the 33rd percentile rank in written expression, and the 43rd percentile rank in mathematics. These ranks represent a one percentile decline since 1975-76. Comparisons with two other tests with 1970 norms placed California twelfth-grade students even lower: at the 33rd and 36th percentiles in reading; at the 26th and 28th percentiles in written expression; and at the 41st and 43rd percentiles in mathematics.

Subgroup Analyses

Statewide test performance was analyzed separately for several different subgroups of pupils, schools, and districts. A summary of the main findings is presented below (but see note following*).

1. Girls scored higher than boys in reading, and boys scored higher than girls in mathematics. These patterns were basically the same in 1975-76.

2. There was a fairly direct relationship between test scores and parental occupational level: The higher the parent's occupational level, as defined chiefly by the amount of education required for the parent's occupation, the higher the student's test scores. Furthermore, the schools with the greatest proportion of high-scoring students made the most progress over the previous year.

3. Schools with a high proportion of students from homes receiving Aid to Families with Dependent Children (AFDC) scored lower than the other schools did. Additionally, schools with high proportions of students from AFDC families made less progress than schools with low proportions of such students.

4. As a group, pupils who spoke Japanese or Chinese in addition to fluent English scored highest of all; pupils who spoke only English scored nearly as high. The students who spoke limited English and another language scored substantially lower than these groups and made the least progress in 1976-77.

   Within the two categories of "fluent English and another language" and "limited English and another language," those students whose other language was Spanish scored substantially lower than those whose other language was other than Spanish. Further, a greater

Table 1

Number of Students Tested and Average Percent of Questions Answered Correctly by Grade Level and Content Area for 1975-76 and 1976-77

Grade level and content area	Number tested	Average percent of questions answered correctly		
		1975-76	1976-77	Difference
Grade 2 -- Reading	299,258	67.7	68.4	+ .7
Grade 3 -- Reading	284,712	81.4	81.7	+ .3
Grade 6	310,843			
Reading		66.1	65.9	- .2
Written Expression		62.5	63.6	+1.1
Spelling		63.6	63.6	-0-
Mathematics		57.4	57.7	+ .3
Grade 12	243,137			
Reading		64.1	63.6	- .5
Written Expression		62.3	61.9	- .4
Spelling		68.0	66.8	-1.2
Mathematics		67.0	66.3	- .7

proportion of all students were coded in these categories in 1976-77, especially in the limited-English-speaking category.

5. The schools that had high scores in 1975-76 made greater gains in 1976-77 than the schools that had low scores in 1975-76.

6. Pupil mobility in the lower grades increased from 1975-76 to 1976-77. Although the more mobile students scored lower than the more stable pupils, the more mobile students made slightly greater progress in 1976-77.

7. The students in unified districts tended to score lower and made smaller gains than those in elementary or high school districts. It should be noted that the student populations of unified districts included a large proportion of disadvantaged students living in the most highly populated cities in California.

8. Small schools usually scored higher than large schools and made more progress from 1975-76 to 1976-77. Correspondingly, the largest schools scored the lowest and registered the smallest gains, especially at the elementary level. Again, these patterns probably reflect the types of students enrolled more than the effect of size--that is, very large schools had the greatest proportion of students from AFDC families and students who spoke limited English.

* Caution: The findings in this section are highly susceptible of misinterpretation. They simply describe the achievement patterns of California students and schools; they do not contain an explanation of the causes of the patterns or how they might be changed. Simple and apparently obvious conclusions are likely to be wrong, since the findings usually are presented for only one factor at a time, and, as always, the achievement patterns result from combinations of many factors. For example, one might conclude from the data in this report that school size is a major determiner of pupil achievement levels. A combination of factors, however, such as the social and economic background of pupils' families, appears instead more nearly to account for most of the test score differences among schools of different sizes. In fact, school size apparently just happens generally to correlate with these other, more significant factors--and the same is true for certain other individual factors, such as pupil mobility and school district organizational structure.

The major portion of this report is devoted to an analysis of the specific test findings for each subject area. Example test questions are presented to illustrate the relative strengths and weaknesses of California students. The discussion of results for each content area is based heavily on the comments of recognized authorities who reviewed the findings and pointed out implications for the improvement of California school programs.

II. Introduction to the Report

This report presents the results for the third full year of the California Assessment Program. The reader's attention is called to several features of the report which have already become traditional.

- Detailed Findings. Information is presented not only for the major content areas of reading, written expression, and mathematics but also for a variety of skill areas within each major area.

- National Comparisons. Although tests were developed specifically to correspond to the skills and concepts being taught in California schools, special studies have been conducted to show how the performance of California students compares with that of recently tested samples of students from throughout the nation.

- Expert Opinions. Recognized authorities in each professional field have presented their interpretations of the results for each of the content areas by identifying areas of relatively satisfactory performance and areas that need attention. Test questions and scores are given in the appendixes to illustrate the nature and range of skills mastered by California students.

Several special features of the 1976-77 report are also worth noting.

- More Examples. Several readers have commented upon the value of seeing actual test items and the way California students responded to those items. A greater number and variety of these examples are presented this year.

- New National Comparisons. A combination of new equating studies and refinements of the equating procedures have made it possible to present the current performance of California students in relation to the most current national norms.

- Comparable Results. The development and refining of the tests used in the California Assessment Program have reached the point where they can be used without revision for a period of years. All results in this report are comparable to those of 1975-76.

- Subgroup Analysis. With the stability of the tests it has become possible and appropriate to examine the differences in standing and in rate of progress among various subgroups of pupils and various types of schools and districts.

Development of the California Assessment Program

The California Assessment Program was first fully implemented in 1974-75. In design, development, and procedures, it is unique in the nation. The assessment program was designed with several criteria in mind: (1) It must be relevant to California schools; (2) It must cover the full range of instructional objectives; (3) It must provide program-diagnostic information at the local and state levels; and (4) It must take only a minimum of testing time. This section describes the process of developing such a program.

Background and Assumptions

The new assessment program had its foundation in two legislative acts: (1) the California School Testing Act of 1969, a revision of a 1961 law which first required an achievement testing program in the public schools; and (2) the Miller-Unruh Basic Reading Act, which originally required reading tests in grades one, two, and three. The testing program was revised by 1972 legislation, and major changes were made in the program as a result of that legislation.

The changes in the statewide testing program were based on the principle that an efficient state testing program has to be limited in scope--that is, limited primarily to the task of furnishing useful information to state-level policy-makers and decision-makers. It was assumed that the program could not meet all of the many information needs of local school district personnel and that assessment information needed at the classroom level could best be collected by local school personnel.

In spite of this assumption, the program was designed to report as much information as possible to local personnel. Since all students at a grade level in all schools were tested, it was possible to provide very detailed analytical reports for each school to supplement locally obtained information. In fact, the results of a survey of all districts in California showed that most districts have found this unique information very useful in evaluating and revising programs. Board members and other local citizens have relied heavily upon statewide results in making judgments about local needs and accomplishments primarily because of the uniform and comparable nature of the information provided.

Reasons for Revising the Testing Program

Two major problems were addressed through the revision of the statewide testing program:

1. Test relevancy and breadth. The incomplete match between the relatively narrow range of skills measured by any one published standardized test, on the one hand, and the variety of instructional programs in California schools, on the other, made it difficult to assess the skills of California students or the effectiveness of the programs with any degree of assurance of fairness. Furthermore, it was not possible to assess the relative strengths and weaknesses of California students in order to have an indication of how instructional programs should be redirected,

since the standardized tests being used yielded only total scores.

2. Testing time. Previous testing instruments required an inordinate amount of pupil time for the testing process--inordinate, at least, in relation to the usefulness of the results. The use of a new testing technique called matrix sampling has now reduced the amount of testing time at certain grade levels from as much as three and one-half hours to 30 minutes. Under this sampling method, all students at a grade level in all schools are tested, but each student takes only a portion of the total test. Results for an individual student cannot be obtained, but quite accurate estimates of the overall performance of groups of students can be computed.

Development of the New Tests

The development of tests related to California goals and objectives followed a rigorous procedure. The major steps are outlined below:

1. Statewide committees of content area experts were formed and charged with the task of translating and delineating the general goals found in state-adopted curriculum frameworks into more specific objectives appropriate for assessment.

2. These specific objectives, or test content specifications, were then reviewed by personnel in all California school districts for completeness and relevance to their instructional programs. The revised specifications served as the basic guidelines for selecting and developing pools of test items. These documents were subsequently printed and distributed to all school districts under the general title Test Content Specifications.

3. These content specifications were sent to major test publishers who identified those test questions which matched the specifications. These were submitted to the Department of Education for review.

4. From the initially large pools of items, teams of classroom teachers reviewed and selected the items that were most appropriate for California students.

5. These items were then reviewed by linguists and minority group testing experts for any subtle biases against students of different language or cultural backgrounds.

6. The final pools of items, several hundred at each grade level were then divided into several short tests or forms--from 10 to 18 per grade level. All test forms were made equivalent in difficulty and in coverage of major skill areas.

The National Norm Dilemma

Since 1962, the first year of statewide testing in California, all tests adopted for use had been commercially published instruments with "national" norms. The new tests described in this report were constructed specifically for use in California schools. The decision to develop tests rather than use commercial "off-the-shelf" tests with national norms was not made casually. Comparison to national averages are not only interesting but are useful as a basis for judging the overall relative effectiveness of California's instructional programs. Furthermore, California law (Education Code sections 60663 and 60640) requires that such information be made available.

A real dilemma, one with both philosophical and technical aspects, faces anyone who would measure the basic skills of California students: to choose a test which has national norms but fails to address all the skills taught in California schools, or to develop a relevant test which does not allow easy and immediate national comparisons. Assessment programs in other states are about equally divided between these two approaches. After eleven years of using tests with national norms but less than satisfactory coverage of the skills being taught in California schools and after observing the difficulties faced by other states in interpreting the results from their own tests without national norms the course to be followed was obvious: Develop a test which fits the instructional programs of most California schools and then find a way to compare those results to national norms.

A plan which could accomplish this (allow one to have one's cake and eat it too) had to overcome two main problems with the national norms associated with published standardized tests.

1. No single test is given to all students in the country. Of necessity, a publisher's norm is, therefore, only an estimate of what the distribution of scores would be like if, in fact, the test had been taken by all students in the United States. For this reason, norms vary from publisher to publisher, sometimes in the extreme. In California's own recent history, the Stanford Reading Test was administered to all second-grade pupils in the 1969-70 school year, and the median California pupil scored at the 38th percentile of that publisher's norms. In the following year the Cooperative Primary Reading Test was administered to all second-grade pupils. The median California pupil scored at the 50th percentile of that publisher's norms. The different result was clearly a reflection more of the difference in norms than of the difference in reading achievement.

2. A second problem with norms is that they are not updated very often. For instance, the Cooperative Primary Reading Test was normed during the 1965-66 school year. As a result, when those norms are referred to, it must be clearly understood that the comparisons being made are to the publisher's estimate of what scores on that test would have been if administered to all pupils in the country at that time. If reading scores for the nation had dropped continuously since 1965-66, an "average" score for California pupils might, in fact, reflect achievement far above current nationwide averages.

The resulting plan is straightforward and efficient. It involves the equating of the California tests to standardized tests with national norms and updating those comparisons as new norms or new tests become available. The equating process requires that a sample of pupils take both the California test and one of the other tests. The effect of the statistical analyses following the testing is to show how California students would have scored if they had all taken the standardized test. Following recent refinements to the equating procedures, a study now has to be conducted only once, but the annual progress on the California test can be translated into the appropriate national percentile ranks (against the year in which the publisher's test was normed, or course, not against the national performance for that year. The latter would be the most useful information, but it is simply not obtainable).

This solution has several advantages: (1) the national comparisons are more timely since they can be updated as new norms become available; (2) the estimates are more stable since they do not depend on the representativeness of a single publisher's sample; and (3) it allows California schools to be assessed with a test which fits the objectives of the instructional program, and simultaneously, with almost no additional testing, allows that performance to be compared to national norms.

Essential Information About the Numbers Used in This Report

The Percent Correct Score. The statistic used in this report to indicate the achievement levels of California pupils is the "average percent correct score." For a given set of test questions, this number is the percentage of correct test responses, with one response being equal to the answer of one student to one question, and the total number of responses being equal to the number of students multiplied by the number of items on the test. For example, if three students took a test with ten questions and if each of the three answered five of the ten questions correctly, the total number of responses would be 30, the total number correct would be 15, and the average percent correct score would be 50. It can also be said that the average student answered 50 percent of the questions correctly; or that, on the average, 50 percent of the questions were answered correctly.

The average percent correct score and the simultaneous presentation of illustrative test questions or exercises are designed to add to the clarity and usefulness of the findings. It should be easier, as a result, to see what California students are able to do. Unfortunately, this method is so new in educational evaluation and assessment that guidelines and rule-of-thumb benchmarks are not available. Each reader will have to evaluate the adequacy of the results. The emphasis is on establishing realistic and necessary levels of actual competence rather than on the traditional comparing of results to a national norm.

How High is High? It will be noted that most of the average percent correct scores hover around the 60s and 70s; however, some are down in the 30s, and some are up in the 90s. Two points must be kept in mind in interpreting these figures:

1. The major reason that the average scores are in the 60s and 70s,

rather than the 90s, is that the aims of the instructional programs at each level in California schools go beyond the basic, minimal levels of performance expected of all students. In reading, for example, those skills which are mastered by most students by the end of the second grade are not even tested in the sixth grade. Testing time is too valuable and the scoring and the processing too expensive to justify gathering information which does not add to what is already known about California students.

2. It should be obvious that high scores in particular subskill areas do not necessarily indicate effective programs; nor low scores, the opposite. Some tasks are inherently more difficult. In reading, for example, it is not considered outstanding that by the end of grade three, nearly all students can immediately recognize and read certain short words; nor is it at all disappointing that only about 60 percent can answer certain questions requiring a student to recognize cause-and-effect relationships among sentences.

Interpretations of Experts. The overall results and especially the differences among various subcontent or skill areas have been reviewed by special advisory committees of highly respected educators in each field. It is hoped that their comments about the adequacy of the findings and their discussion of the implications for shifts in program emphasis will be helpful both to the professional educator and the lay citizen concerned with education in California. Obviously, however, not all readers will agree with the opinions of the specialists. Any discussion or inquiry which is stimulated by these opinions is useful in that it will help to clarify the proper objectives of the schools and foster realistic expectations of them.

III. Reading Achievement for Grades Two and Three

Synopsis of Findings

Over the last 11 years, reading achievement test scores in grades two and three have shown slow but steady improvement. Second-grade scores increased slightly (.7 percent) from 1975-76 to 1976-77, which translated into a gain of one percentile point on national norms. Thus, the median second-grade pupil moved from the 54th to the 55th percentile rank--five percentile points above the national average. Third-grade scores increased .3 percent from 1975-76 to 1976-77, which also translated into a gain of one percentile point on national norms. The median third-grade pupil now ranks at the 56th percentile--six percentile points above the national average. See Chapter VIII, "Comparisons with National Norms," for details.

Test Scope

The Reading Test: Second and Third Grades is the instrument developed specifically to assess reading achievement at the end of the second and third grades in California's elementary schools. It was designed to assess a wide variety of objectives discussed broadly in Framework in Reading for the Elementary and Secondary Schools of California (Sacramento: California State Department of Education, 1973) and specified, with the help of the Reading Assessment Advisory Committee, in Test Content Specifications for California State Reading Tests (Sacramento, California State Department of Education, 1975). Both the objectives and the 250 test items that were used to assess them fall into one of six major skill areas: phonetic analysis, structural analysis, vocabulary, literal comprehension, interpretive-critical comprehension, or study-locational.

Comparison of 1975-76 and 1976-77 Results, Grades Two and Three

The results of second-grade performance on the total reading test and in each of the major skill areas for 1974-75, 1975-76, and 1976-77 are shown in Table 2. Thus, changes in performance from year to year over this time span are also presented in Table 2.

The data in this table reveal a slight increase in overall second-grade reading performance from 1974-75 to 1975-76 (+.1 percent correct) and from 1975-76 to 1976-77 (+.7 percent correct). From 1974-75 to 1976-77 there was a total increase of .8 percent correct. Skill area scores either increased or remained the same from 1974-75 to 1975-76 and from 1975-76 to 1976-77 for all skill areas except vocabulary and literal comprehension. Both of these skill areas registered slight declines from 1974-75 to 1975-76, however both registered larger increases from 1975-76 to 1976-77 resulting in a total increase of .9 in both skill areas from 1974-75 to 1976-77.

Table 2

Grade Two Reading Test Results for 1974-75, 1975-76, and 1976-77

Skill area	Number of questions	Average percent correct			Gain (+) or loss (-) in score		
		1974-75	1975-76	1976-77	1974-75 to 1975-76	1975-76 to 1976-77	1974-75 to 1976-77
TOTAL	250	67.6	67.7	68.4	+ .1	+ .7	+ .8
Word identification	60	75.4	75.5	76.2	+ .1	+ .7	+ .8
Sight words	5	83.9	84.5	85.4	+ .6	+ .9	+1.5
Phonetic analysis	45	76.5	76.5	77.1	-0-	+ .6	+ .6
Structural analysis	10	65.8	66.3	67.5	+ .5	+1.2	+1.7
Vocabulary	60	67.7	67.6	68.6	- .1	+1.0	+ .9
Comprehension	110	61.3	61.3	62.4	-0-	+1.1	+1.1
Literal	77	62.5	62.3	63.4	- .2	+1.1	+ .9
Interpretive	33	58.7	59.1	60.0	+ .4	+ .9	+1.3
Study locational	20	75.5	77.2	77.9	+1.7	+ .7	+2.4

Table 3

Grade Three Reading Test Results for 1974-75, 1975-76, and 1976-77

Skill area	Number of questions	Average percent correct			Gain (+) or loss (-) in score		
		1974-75	1975-76	1976-77	1974-75 to 1975-76	1975-76 to 1976-77	1974-75 to 1976-77
TOTAL	250	81.3	81.4	81.7	+ .1	+ .3	+ .4
Word identification	60	85.8	85.6	85.9	- .2	+ .3	+ .1
Sight words	5	92.7	92.6	92.9	- .1	+ .3	+ .2
Phonetic analysis	45	86.1	85.9	86.2	- .2	+ .3	+ .1
Structural analysis	10	80.9	80.8	81.1	- .1	+ .3	+ .2
Vocabulary	60	82.6	82.9	83.4	+ .3	+ .5	+ .8
Comprehension	110	77.0	76.7	77.1	- .3	+ .4	+ .1
Literal	77	77.9	77.5	78.0	- .4	+ .5	+ .1
Interpretive	33	74.9	74.9	75.0	-0-	+ .1	+ .1
Study locational	20	88.0	88.0	88.8	-0-	+ .8	+ .8

The results of third-grade performance on the total reading test and in each of the major skill areas for 1974-75, 1975-76, and 1976-77 are shown in Table 3. Thus, as was the case for grade two, changes in performance from year to year over this time span are also immediately apparent from the table.

As is evident from Table 3, there was a slight increase in overall third-grade reading performance from 1974-75 to 1975-76 (.1 percent) and from 1975-76 to 1976-77 (.3 percent), yielding a total increase of +.4 percent correct from 1974-75 to 1976-77. From 1974-75 to 1975-76 slight declines were registered in all of the skill areas except for vocabulary, in which the percent correct score increased slightly (.3 percent), and interpretive comprehension and study-locational skills, in which the scores remained the same. From 1975-76 to 1976-77 increases were registered in all of the skill areas, which resulted in total gains in all of the skill areas from 1974-75 to 1976-77.

Discussion and Analysis of Reading Test Results, Grades Two and Three

The members of the Reading Assessment Advisory Committee have consistently asserted that the ultimate aim of all reading instruction is comprehension; that is, the ability of pupils to understand written material. However, comprehension depends upon the mastery of many interrelated skills. Therefore, the following discussion illustrates some of the skills that second- and third-grade pupils have and have not mastered. The reader may wish to refer to Appendix A for additional information and examples pertaining to each of the skill areas.

Phonetic Analysis

Forty-five of the 250 questions on the second- and third-grade Reading Test required the pupils to match sounds with letters or with combinations of letters. Since the initial phases of reading instruction usually focus upon such sound-symbol correspondences, one would expect scores in this area to be among the highest on the test. The skill area score data in Tables 2 and 3 reveal that this is, in fact, the case for both grade two (77.1 percent correct) and grade three (86.2 percent correct). While the scores on most phonetic analysis questions were generally high, the range of the scores was, nevertheless, quite broad--from a high of 98 percent correct to a low of 49 percent correct. For example, almost all second- and third-graders demonstrated mastery on questions that required them to match pictures with initial consonants, as is illustrated by Example A.

Example A

Look at Box 5. **** Mark the one that **goes best** with the picture. **** Mark the one that **goes best** with the picture.

	d	k	h
	○	○	●
Grade 2:	(2)	(2)	(96)
Grade 3:	(1)	(1)	(98)

The task in Example A required the pupils to identify the word represented by the picture and to match the word with its beginning letter (in this case, the consonant "h"). The item data indicate that by the end of third grade, almost all pupils have mastered rote items of this nature.

Some phonetic analysis questions, however, were more difficult than that shown in Example A. For instance, ten items required the pupils to match a short-vowel sound (pronounced by a teacher) with its corresponding letter in a three-letter word. The task in Example B is illustrative of this type of item.

Example B

Look at Box 1. ******** Mark the word that has the **same** sound in its middle as **cut**. ******** Mark the word that has the **same** sound in its middle as **cut**.

	fun	fin	ran
	●	○	○
Grade 2:	(84)	(9)	(7)
Grade 3:	(91)	(5)	(4)

Items like Example B were more complex than those like Example A because (1) they involved words rather than a single letter; and (2) vowels (which vary considerably in sound from word to word) were being tested rather than consonants (which as a rule tend to be more consistent in sound from word to word). As the item data reveal, about 84 percent of the second graders and about 91 percent of the third graders performed successfully on questions of this type.

The ten items that required pupils to discriminate between different sounds of the same vowel were even more difficult. Example C is such an item.

Example C

Look at Box 2. ******** Mark the word that has the **same** sound in its middle as **like**. ******** Mark the word that has the **same** sound in its middle as **like**.

	ripe	rope	rich
	●	○	○
Grade 2:	(72)	(5)	(23)
Grade 3:	(80)	(2)	(18)

The type of item in Example C tested pupils' mastery of a more advanced phonetic skill in the context of slightly longer words. The increased degree of difficulty was reflected by still lower percent correct scores as shown in the item data (72 percent correct for grade two; 80 percent correct for grade three) for Example C.

Structural Analysis

While the phonetic analysis questions on the Reading Test assessed the pupils' awareness of sound-letter correspondences, the structural analysis items tested their knowledge of word parts, such as roots, suffixes, prefixes, contractions, and the elements of compound words. As was true of the phonetic analysis skill area, some structural analysis questions were more difficult than others. For example, a majority of second- and third-graders correctly identified the following contraction in Example D.

Example D

Look at Box 6. **** Mark the word that **means the same** as the word that is underlined. **** Mark the word that **means the same** as the word that is underlined.

that's

	that is	that is not	that was
	●	○	○
Grade 2:	(85)	(10)	(5)
Grade 3:	(93)	(3)	(4)

However, not as many pupils at either grade level recognized the correct division of a compound word into its component parts, as is illustrated by Example E.

Example E

upstairs

	ups + tairs	upst + airs	up + stairs
	○	○	●
Grade 2:	(22)	(13)	(65)
Grade 3:	(14)	(4)	(82)

After reviewing second- and third-grade scores on the structural analysis questions, members of the Reading Assessment Advisory Committee judged that scores should be still higher in this skill area since the cluster of structural analysis skills constitutes a fundamental building block of reading comprehension.

Vocabulary

The 60 vocabulary questions required the pupils to identify the meanings of words in a variety of formats. This ability to recognize word meanings is another fundamental building block of literal comprehension. The difficulty of the vocabulary questions appeared to depend upon the difficulty of the test word and the testing format used. For example, 75 percent of the second-graders and 90 percent of the third-graders demonstrated an understanding of the word "small" in the following item.

Example F

Look at Box 9. ******** Mark the word that **means the same** as the word that is underlined. ******** Mark the word that **means the same** as the word that is underlined.

a small cake

	pink	birthday	butter	little
	○	○	○	●
Grade 2:	(3)	(17)	(5)	(75)
Grade 3:	(1)	(6)	(3)	(90)

However, fewer pupils identified the meaning of the more difficult word "bashful" in Example G.

Example G

a bashful boy

	brave	shy	new	noisy
	○	●	○	○
Grade 2:	(30)	(56)	(6)	(8)
Grade 3:	(16)	(75)	(4)	(5)

Ten of the vocabulary questions tested the pupils' understanding of antonyms. A question of this type is given in Example H.

Example H

Look at Box 12. **** Mark the word that **means the opposite** of the word that is underlined. **** Mark the word that **means the opposite** of the word that is underlined.

begin

	end	open	start
	●	○	○
Grade 2:	(61)	(15)	(24)
Grade 3:	(75)	(6)	(19)

Questions such as that in Example H required the pupils not only to identify the meaning of the test word but also to determine a word opposite in meaning from it. The extra complexity of the task may be the reason that the percent correct score on such an easy word is so close to the score on the more difficult vocabulary item in Example G.

Several vocabulary items were tested in still another format. On these items the pupils were required to select a word for a given blank in a sentence. Example I illustrates this kind of vocabulary question.

Example I

We are going to have_____for supper.

	dish	until	soup	stones
	○	○	●	○
Grade 2:	(10)	(5)	(77)	(8)
Grade 3:	(4)	(2)	(89)	(5)

Literal Comprehension

While the phonetic analysis, structural analysis, and vocabulary questions focused upon sound-letter correspondences, parts of words, and word meanings, the 77 literal comprehension items required the pupils to identify explicitly stated elements in larger units of material, such as sentences and paragraphs. Given the increase in skill complexity, it is logical to expect lower average percent correct scores for this area than for the less complex skill areas already discussed. The data in Tables 2 and 3 confirm this expectation with an average percent correct score of 63.4 in the second grade and 78.0 in the third grade.

However, within the skill area of literal comprehension, the test questions varied considerably in complexity. Consider, for instance, the question in Example J.

Example J

Read the story and answer the questions.

Bonnie is a spaniel dog.
She likes to go in the water.
She rolls in puddles and tries to get into the children's plastic wading pool.
At the beach she likes to have sticks thrown into the water.
Then she can run out and get them.

Grade 2	Grade 3	She rolls in
(14)	(7)	○ pools.
(75)	(88)	● puddles.
(11)	(5)	○ the ocean.

All of the information that the pupils needed to answer the above question is contained verbatim in the third sentence of the passage (underlined here for the reader's convenience). Since the item is a rote literal comprehension item involving a perceptual match between words in the item stem and words in the passage, the high percent correct scores were not surprising.

The literal comprehension question in Example K was more difficult than that in Example J.

Example K

Read the story and answer the questions.

Did you ever see a mouse that could fly? A bat is sometimes called a flying mouse.

A bat is a furry animal. It has no feathers. Instead, its wings are made from skin. The skin stretches from the tips of its front legs to the tips of its back legs.

Some bats are as tiny as mice. Others can spread their wings nearly as wide as an eagle can.

A bat is not like flying fish or flying squirrels. Those animals glide only a little way. But a bat is like birds and some insects. It can stay up in the air as long as it wants to.

Example K (cont.)

Flying squirrels can

Grade 2	Grade 3	
(18)	(15)	○ glide as long as they want.
(49)	(64)	● glide only a little way.
(20)	(11)	○ fly like birds.
(13)	(10)	○ fly like bats.

To answer the question in Example K, the pupils had to put together two sentences (underlined here for the reader's convenience), a process which involved recognizing that "those animals" refers back to "flying fish" and "flying squirrels." Only 49 percent of the second-graders and 64 percent of the third-graders managed the task successfully.

Other literal comprehension questions required the pupils to identify action sequences from the sentence order of a story. Example L reveals that this type of item was also difficult for many second- and third-graders.

Example L

Read the story and answer the questions.

My mother has many friends. They always say to me, "Why, Davie, how you've grown!"

I decided to play a trick on them.

One day these women were at our house. I went and said hello to them. Then I rushed out before they could say a word.

I went to my little brother. I dressed him in my shirt and pants. Then he went to see my mother's friends.

"Why, Davie, how you've . . ."

They stopped. I had not grown; I had gotten smaller. They were fooled. And they never said it again.

Which happened first?

Grade 2	Grade 3	
(51)	(69)	● Davie decided to fool the women.
(20)	(15)	○ Davie gave his brother his clothes.
(15)	(9)	○ The women never said it again.
(14)	(7)	○ The women were fooled.

After reviewing the performance of the second- and third-grade pupils on the literal comprehension questions, the members of the Reading Assessment Advisory Committee concluded that the performance of both second- and third-graders was adequate in this skill area.

Interpretive-Critical Comprehension

The 33 interpretive-critical comprehension questions required the pupils to make inferences from explicit elements in a passage. The increased difficulty of the questions in this skill area was reflected in the low average percent correct scores (60.0 percent) for the category. As was true of the literal comprehension questions, some interpretive-critical comprehension questions were easier than others for the pupils. Example M illustrates one of the easier interpretive-critical questions.

Example M

Read the story and answer the questions.

Once there was a little boy who had a big problem. Every time the boy tried to talk his words came out backwards. No one could understand what he was saying!

The little boy's parents took him to the best doctors in the county. The doctors could find no way to help the little boy.

One night the little boy had a dream. He dreamed that if he walked backwards people would understand what he was saying.

When he awoke the next morning he decided to see if his dream would come true. He walked backward to the kitchen. He spoke to his mother and father. Guess what? They could understand him!

Grade 2	Grade 3	At the end of the story the little boy probably felt
(71)	(84)	● happy.
(15)	(7)	○ unhappy.
(4)	(3)	○ angry.
(10)	(6)	○ sad.

To answer the above question correctly, the pupils had to (1) comprehend the story; and (2) infer how the outcome of the events would make the little boy feel. Thus, the item was a discriminating test of their overall comprehension of the passage. As the item data reveal, 71 percent of the second-graders and 84 percent of the third-graders handled this question successfully.

While over two-thirds of both the second- and third-grade pupils correctly answered the question in Example M, fewer students successfully handled a similar item in Example N.

Example N

Read the story and answer the questions.

Ben and Billy climbed down a rope into the cave. It was cold and dark, damp and quiet.

"Swell house for a ghost," Ben whispered. He shined the flashlight all around.

The room was filled with rocks. There were pink ones and green ones, and other colors too. Some of the rocks were bigger than the boys, but some were the size of potatoes.

All of a sudden, something soft and wet dropped on Ben's head. "What's that?" asked Billy.

"Let's get out of here fast," Ben shouted. But as he started to run, he dropped the flashlight. It smashed on the cave floor. Now they couldn't see anything at all.

After the flashlight dropped, Ben probably felt

Grade 2	Grade 3	
(22)	(15)	○ hopeful.
(18)	(14)	○ calm.
(8)	(5)	○ proud.
(52)	(66)	● helpless.

The lower percent correct scores on the question in Example N probably reflect a greater degree of complexity in the passage as well as more difficult vocabulary in the four response options. An even more difficult comprehension question required the pupils to derive a conclusion from factual information, as illustrated by Example O.

Example O

Read the story and answer the questions.

Most people believe that earthworms are of little use except for fish bait. But scientists have found that they are very important. Earthworms eat soil. They make the soil better by grinding it up as it passes through their bodies. The holes that earthworms make as they burrow in the earth make it easier for the roots of plants to enter the soil. Earthworms use leaves to line their underground homes. These leaves make the soil richer. Scientists have found that earthworms are the earth's plowmen. They keep stirring up the soil which helps to raise better crops.

Example O (cont.)

Grade 2	Grade 3	Earthworms should have no trouble finding
(10)	(7)	○ company.
(24)	(19)	○ crops.
(56)	(67)	● food.
(10)	(7)	○ fishermen.

Only 56 percent of the second-graders and 67 percent of the third-graders selected the best answer on the inferential question in Example O.

The members of the Reading Assessment Advisory Committee concluded that, given the difficulty of the interpretive-critical questions, California's second- and third-graders are doing very well.

IV. Reading Achievement for Grades Six and Twelve

Synopsis of Findings

In spite of a very slight decline (.2 percent correct) in sixth grade reading scores, the median sixth-grade student in California continues to rank at the 53rd percentile on national norms in reading achievement--three points above the national average. On the other hand, a decline of .5 percent correct in twelfth-grade reading scores translated into a loss of one percentile point on national norms. Thus, the median twelfth-grade student dropped from the 42nd to the 41st percentile and is now 9 percentile points below the national average. See Chapter VIII, "Comparisons with National Norms," for details.

Since 1974-75 the members of the Reading Assessment Advisory Committee have reviewed and analyzed statewide reading results. By weighing percent correct scores for each item against their expectations of student performance at different ages, the committee members have been able to identify areas of relative strength and weakness. While such judgments reported here are based upon the Committee's analysis, the Department of Education assumes full responsibility for the content of this report.

In the review of sixth-grade results, the members of the Reading Assessment Advisory Committee were generally satisfied with sixth-grade reading performance. However, they suggested increased instructional emphasis in the following skill areas as a means of improving the reading comprehension abilities of sixth-grade students: (1) structural analysis (recognizing the meanings of roots, suffixes, and prefixes); (2) vocabulary (developing knowledge of word meanings and the use of context clues); and (3) interpretive-critical comprehension (interpreting, evaluating, and inferring from information and ideas stated in written material).

Twelfth-grade performance measured up to the expectations of the Reading Assessment Advisory Committee in most reading skill areas. The members of the committee observed that twelfth-grade performance was generally strong on questions requiring them to identify easily detectable, explicitly stated elements in written material presented in a straightforward manner. The committee noted, however, that performance tended to be weaker on tasks requiring students to read carefully, infer conclusions from details, and use subtle clues in detecting the author's attitude or implicit intent.

Reading Results for Grade Six

Test Scope

The reading section of the Survey of Basic Skills: Grade 6 consisted of 128 questions. The items were selected to assess a wide variety of objectives discussed broadly in Framework in Reading for the Elementary and Secondary Schools of California (Sacramento: California State Department of Education, 1973) and specified, with the help of the Reading Assessment Advisory Committee, in Test Content Specifications for California State Reading Tests (Sacramento: California State Department of Education, 1975). Both the objectives and the questions used to assess them fall into one of five major skill areas: word identification, vocabulary, literal comprehension, interpretive-critical comprehension, and study-locational skills. The emphasis assigned to each of the skill areas on the Survey of Basic Skills: Grade 6 is presented graphically in Figure 1.

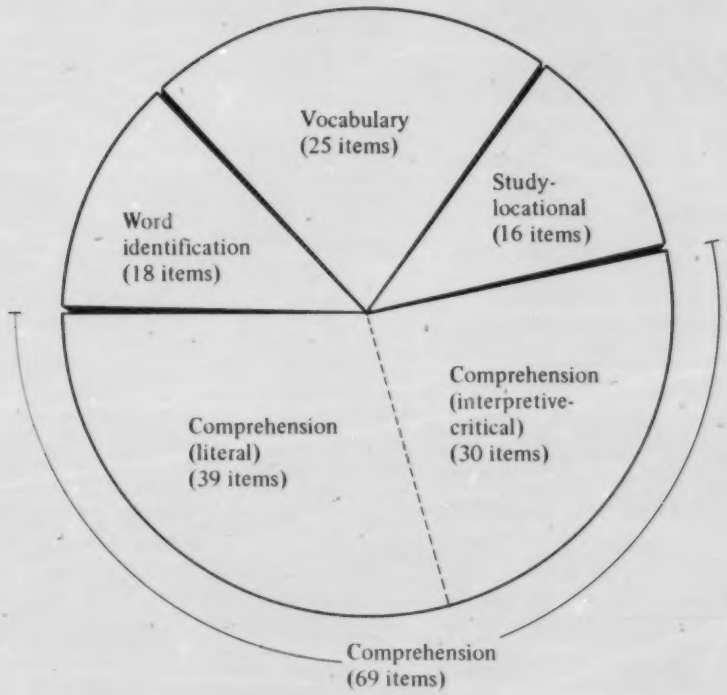

Fig. 1. Number of questions, by skill area, in the reading portion of the *Survey of Basic Skills: Grade 6*

Comparison of 1975-76 and 1976-77 Results, Grade Six

The results of sixth-grade performance on the total reading test and in each of the skill areas for 1975-76 and 1976-77 are presented in Table 4. The changes in overall performance and skill area performance also are shown in Table 4.

Table 4

Reading Performance of California Sixth-Grade Students on the Survey of Basic Skills: Grade 6

Skill area	Number of questions	Average percent correct		Gain (+) or loss (-) in score
		1975-76	1976-77	-4 -2 0 +2 +4
TOTAL READING	(128)	(66.1)	(65.9)	(-0.2)
Word Identification	18	74.3	74.2	-0.1
Vocabulary	25	67.1	66.3	-0.8
Comprehension	69	64.9	64.9	0.0
Literal	39	67.4	67.2	-0.2
Interpretive-Critical	30	61.8	62.0	+0.2
Study-Locational	16	60.0	59.8	-0.2

The data in Table 4 reveal a very slight decline of .2 percent correct in overall sixth-grade reading performance. The loss in the area of literal comprehension was balanced by an equivalent gain in interpretive-critical comprehension, resulting in no change for the total comprehension skill area. Performance in all the other skill areas declined slightly. The largest decline (.8 percent correct) was in the area of vocabulary.

Discussion and Analysis of Skill Area Results, Grade Six

The members of the Reading Assessment Advisory Committee have consistently stressed that comprehension, the ability to understand written material, is the ultimate goal of all reading instruction. However, comprehension is a complex process composed of an interlocking hierarchy of skills. Therefore, the following discussion is designed to illustrate patterns that are characteristic of sixth-grade reading performance in the areas of word identification, vocabulary, literal comprehension, and interpretive-critical comprehension, which constitute

the hierarchy of skill areas tested on the Survey of Basic Skills: Grade 6. These skill areas are discussed below in the order of their complexity moving from lesser to greater degrees of complexity. The reader may wish to refer to Appendix B for additional information and examples pertaining to each of the skill areas.

Word Identification. Eighteen of the 128 questions on the sixth-grade reading test assessed word identification skills; i.e., recognition of sound-letter correspondences and knowledge of word parts. Because the questions required students to process information at the word level only, one would expect performance to be highest in this area. As the data in Table 4 reveal, this was the case. The percent correct for word identification, 74.2 percent correct, was higher than the average skill area scores in the other areas. However, since some of the questions were harder than others, scores did vary considerably--from 90 percent correct to 49 percent correct.

The following three prefix questions (examples A, B, and C) illustrate the range of performance. (The corresponding test passages are omitted here for the reader's convenience.) The percent of students who selected each response is shown to the left of each response.

Example A

We know from the prefix dis in the word disagreeable in paragraph 3 that the odor of a sponge would

(4) ○ agree with other animals.
(83) ● not agree with other animals.
(6) ○ often agree with other animals.
(7) ○ probably agree with other animals.

Example B

We know from the prefix un in the word undyed that the woolen cloth was

(7) ○ dyed apart.
(7) ○ dyed back.
(14) ○ dyed over again.
(72) ● not dyed.

Example C

We know from the prefix semi in semicircle that it was in the shape of a

(16) ○ whole circle.
(58) ● half circle.
(14) ○ quarter circle.
(12) ○ big circle.

The examples above suggest that variations in performance on prefix questions depended primarily upon the particular prefix being tested.

A similar pattern of variable performance was evident on the cluster of suffix questions, as the following three examples (D, E, and F) illustrate (the corresponding test passages are omitted):

Example D

In the third sentence the suffix -est in the word fattest means:

(13) ○ having more fat
(3) ○ having less fat
(3) ○ having the least fat
(81) ● having the most fat

Example E

The word investigator means:

(5) ○ investigation
(78) ● one who investigates
(8) ○ the act of investigating
(9) ○ to investigate

Example F

The ending of the word harmless helps to make the word mean:

(8) ○ harmful
(67) ● without harm
(3) ○ very harmful
(1) ○ more harmful
(21) ○ less harmful

While the scores on most word identification questions were generally high, they are representative of a skill area that is probably more amenable to instruction than some of the more complex reading skills. The members of the Reading Assessment Advisory Committee noted in Student Achievement in California Schools: 1975-76 Annual Report (Sacramento: California State Department of Education, 1976, p. 19) that increased instructional emphasis in the meanings of roots, suffixes, and prefixes may constitute one relatively efficient means of helping students improve their reading comprehension abilities.

Vocabulary. The 25 vocabulary questions on the sixth-grade reading test required students to identify the meanings of words as they were used in a paragraph. As can be seen from Table 4, the average score for vocabulary was 66.3 percent correct. While scores of 60 percent correct or above were obtained on 21 of the 25 vocabulary questions, the range of scores ran from a high of 85.2 percent correct to a low of 19.9 percent correct. The percent correct scores appeared to vary with the difficulty of the test word and with the degree to which context clues could be used.

The easiest vocabulary item on the sixth-grade test is shown below (Example G):

Example G

Squirrels are found practically everywhere except in the distant countries of Madagascar and Australia. The common squirrel of Europe and North Asia is dusky red in color. In North America the gray squirrel is seen more often.

But the most beautiful squirrel in all the world is the raffalii squirrel. This little animal lives only in hot jungle countries and is almost as brightly colored as a bird. Its head, back, and tail are black as coal. Its sides and shoulders are a snowy white, and its underparts are a deep and lovely red.

Of all the squirrels in the world the raffalii has the easiest life. Squirrels in northern countries must store away enough food to provide for the long winters. But the raffalii never has to worry about food, for there is always plenty.

The raffalii does not even have to build a house to live in. Other squirrels must find a hollow in a tree or dig out a hole in some fallen log in the woods. The raffalii's home is already there for him. It consists of the basket ferns that grow in the damp branches of jungle trees. These soft ferns are really shaped like small baskets. So all the little raffalii has to do when he wants to go to bed is jump into one of them and be rocked to sleep in a ready-made treetop cradle!

The word tail in the second paragraph means:

(4) ○ story (85) ● part of an animal's body
(2) ○ follow (9) ○ the back of a bird

As one can see from the item data, 4 percent of the students confused "tail" with "tale"; 2 percent confused the noun and verb usages of the word "tail"; and 9 percent knew the meaning of the word but failed to detect its usage in the context of this particular passage.

Even more students failed to use the context clues provided in the following item (Example H):

Example H

Can bees see colors? If they can, color vision is probably useful to them. If bees can see colors, they probably find flowers more easily. Bees fly from flower to flower gathering nectar, a sweet substance used in making honey. In the process they transfer pollen from flower to flower. If it were not for the pollinating process, plants couldn't make seeds.

To find out if bees can see color, some investigators placed two squares of paper—one blue and one green—in the bottom of a cage of bees. They set a tiny dish on each square. They filled the dish on the blue square with a solution of sugar and water and left the dish on the green square empty.

At first the bees landed on both squares. But soon they were all clustered on the blue square, feeding on the sugar water. After a while the investigators emptied the dish of sugar water but left the dish in the cage. The bees still landed only on the blue square. Even when the squares were moved to different places in the cage, the bees went to the blue square.

The investigators knew, however, that many animals can't see color; they see things only in different shades of gray. Perhaps the bees could tell the squares apart because they saw green and blue as different shades of gray. The investigators replaced the green square with many gray squares, each a different shade. On each gray square they put an empty dish; on the one blue square they also put an empty dish. As before, the bees landed only on the blue square.

The word nectar means:

(76)● a sweet substance
(11)○ honey
(11)○ pollen
(2)○ seeds

To answer correctly the question in Example H, students did not have to know the meaning of the word "nectar"; they merely needed to observe the definition of the word in the phrase following it in the passage (underlined here for the reader's convenience). While over three-fourths of California's sixth-graders responded correctly, the fact that one-fourth of them failed to make use of such an obvious context clue is noteworthy.

On many other vocabulary questions, students could not rely totally on context clues. For example, on the following item (Example I), students had to know the meaning of the test word, or they were likely to miscue on a context clue and select one of the distractors.

Example I

Can you imagine a perfect little deer no taller than the average book? Can you picture a deer standing erect with all four feet on the palm of a man's hand? The mouse deer of Malaya is just that size. He measures about eight inches at the shoulder, has pencil-sized legs and tiny cloven hoofs.

The people of Malaya have built up many folk tales and legends about the mouse deer or pelandok, as they call the attractive little animal. He is like "Reynard the Fox" in European fables, and like "Br'er Rabbit" in American stories. He is, of course, a harmless little animal, and having no means of defense, has a great many enemies including a few natives who sometimes have a dinner of pelandok stew.

The word average means:

(10) ○ pencil- or pen-sized
(65) ● middle or typical
(16) ○ little or small
(9) ○ the size of a man's hand or foot

Some committee members expressed surprise that only 65 percent of the students correctly identified the meaning of the word "average" on this question.

Sixth-grade students' performance on these and other vocabulary items suggests two additional strategies for strengthening students' comprehension skills: (1) increased instructional emphasis in the use of context clues; and (2) increased instructional emphasis in general vocabulary development.

Literal Comprehension. While the word identification and vocabulary questions focussed upon individual words and parts of words, the 39 literal comprehension questions required students to identify explicitly stated elements in still larger units of material, such as sentences and clusters of sentences. The average percent correct for literal comprehension was 67.2, and the scores ranged from a high of 91 percent correct to a low of 32 percent correct. Scores over 60 percent correct were obtained on about three-fourths of the 39 literal comprehension questions. A major factor that affected the difficulty of the literal comprehension questions was the amount of information upon which a given question was based. Some questions were based upon information contained within a single sentence, whereas others were based on information from a

series of sentences. For example, the following literal comprehension question (Example J) could be answered by referring to a single sentence (underlined here for the reader's convenience).

Example J

A new kind of star is shining over New York City. It is at the top of a tall, steel tower on an office building. It can be seen from a distance of five miles and tells by changing its color what kind of weather New York City is going to have.

Clear weather is coming if the star is green. Orange means the weather will be cloudy. If the star is flashing orange, New York children wear rubbers and raincoats because rain is on the way. When the star is flashing white, snow is on the way and children get out their sleds. This is the most modern way to predict what the weather is going to be. For a long time radio and newspapers were the principal sources of information concerning the weather. Now a new way has been found.

How would you like to have a star tell you when you can go on your picnic? Maybe the star will tell you the weather is unsuitable and you will have to eat your picnic lunch inside.

A green star shining atop the building means

(4) ○ children should wear their boots.
(2) ○ snow.
(91) ● clear weather.
(3) ○ children should get out their sleds.

On this particular question 91 percent of the students selected the correct response. However, another literal question which was based upon the same passage proved to be more difficult. This question (presented below as Example K) was derived from the first three sentences of the passage shown in Example J. The literal comprehension task in this item involved relating the word "It" in the third sentence back to its referent, "A new kind of star" in the first sentence.

Example K

What can be seen from a distance of five miles?

(6) ○ New York City
(14) ○ A steel tower
(5) ○ An office building
(75) ● A new kind of star

A lesser proportion of students (about three-fourths) successfully handled the more complex literal comprehension item. Therefore, one can see that (all other things being equal) it is generally easier for students to process information contained within a single sentence than it is for them to identify the referents of particular words appearing in different sentences. Student performance on this question suggests that helping students understand the relationships between words and their referents is another important strategy for improving students' comprehension abilities.

Another major factor that affected the difficulty of the literal comprehension questions was the overall difficulty (or readability level) of the test passages. Example J, for instance, is a within-sentence literal comprehension question based on a passage with an estimated sixth-grade readability level.[1] The following item (Example L) is also a within-sentence literal comprehension question, but it is based upon a passage with an estimated seventh-grade readability level.

Example L

Can you imagine a perfect little deer no taller than the average book? Can you picture a deer standing erect with all four feet on the palm of a man's hand? The mouse deer of Malaya is just that size. He measures about eight inches at the shoulder, has pencil-sized legs and tiny cloven hoofs.

The people of Malaya have built up many folk tales and legends about the mouse deer or pelandok, as they call the attractive little animal. He is like "Reynard the Fox" in European fables, and like "Br'er Rabbit" in American stories. He is, of course, a harmless little animal, and having no means of defense, has a great many enemies including a few natives who sometimes have a dinner of pelandok stew.

A pelandok is a:

(13) ○ fox
(6) ○ folk tale
(71) ● mouse deer
(1) ○ country
(9) ○ rabbit

Whereas 91 percent of the students selected the correct answer in Example J, only 71 percent successfully handled the same kind of question which was based upon more difficult material. The difference in scores on these two items

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[1] The readability estimates in this document were determined from the Fry Readability Graph, which is based on the average number of syllables and average number of sentences per 100 words.

reveals the inverse relationship between comprehension and readability; that is, as the difficulty of reading material increases, students' comprehension of the material decreases.

Interpretive-Critical Comprehension. The most difficult and complex reading comprehension skill area is interpretive-critical comprehension. The 30 interpretive-critical comprehension questions on the sixth-grade reading test required students not only to comprehend explicitly stated material in a passage but also to draw inferences from that material. As one might expect, this skill area was more difficult for students than any of the previously mentioned skill areas. The average percent correct for interpretive-critical comprehension was 62.0; scores ranged from a high of 90 percent correct to a low of 34 percent correct.

The 90 percent correct score was achieved on the question in Example M. This item was based upon a passage that is probably representative of some of the easier reading materials encountered by sixth-graders. The question asked students to determine what the story was mostly about. Since all the options given were mentioned in the passage, the students had to weigh the various choices and decide which one represented the main idea. Thus, the item appears to be a good test of the students' overall comprehension of the passage.

Example M

My name is James, same as my father's. My mother calls me Jimmy. My father is called Jim. He always wakes me up in the morning. He calls me Jim. I hope I'm like him when I grow up.

My father works as a plumber's helper, and for extra money, he is a night watchman. Mother says that Daddy works very hard to make us happy, and Daddy says the same thing about Mother. Both Daddy and Mother say that we make them happy because we are their children.

On Sunday we all go to church together—my father, mother, my older sister, and my younger brothers, Jerry and Willie, and I. When we come home, we have a good dinner. We have fun on Sundays. Daddy and Mother don't have to go to work then. They have time to play with us or take us for a ride in the car.

The story tells the most about

(2)○ what a plumber does.
(90)● a happy family.
(2)○ going to church.
(6)○ a hard job.

Another interpretive-critical comprehension question based upon the same passage presented more difficulty. This question (Example N) required students to make an inference from the first sentence of the third paragraph (underlined in the passage for the reader's convenience).

Example N

You can tell from the story that James is the

(9) ○ oldest child.
(71) ● second oldest child.
(12) ○ third oldest child.
(8) ○ youngest child.

While 90 percent successfully identified the main idea of the passage, only 71 percent of the students reached a correct conclusion from a detail contained within the same passage. Thus, 29 percent failed to make the correct inference from the key information provided or failed to locate the sentence containing the key information in the first place.

The item below (Example O) illustrates one of the most difficult questions on the test.

Example O

My mother liked to tell about one visit they made to Chief Pereshonts' grave. The children were always half afraid of this deep cavern in the black rock, because they had been told that Pereshonts' squaw and horse had been killed and buried with him. Mother's sister Patty was a daredevil; so when one of the cousins dared her to enter the grave, down she went. She called up descriptions of the skeletons, and they realized that what they had been told was true. This gave them a strange feeling, and they were in a hurry to leave. But Patty took her time coming out of the grave. She brought a skull which she said was that of Pereshonts, and she chased them all home with it.

Grandmother shuddered when Patty set the thing on the mantle, and Great-Aunt Mary teased, saying that Pereshonts' ghost would come for it. Patty scoffed at the idea of ghosts and calmly ate her supper. She put the skull on her bedpost that night.

In the night she woke my mother and whispered, "Listen!" There was a tap-tap-tapping on the window. After a time it came again, like the sound of a fist on the glass. The girls hid their heads under the covers and clung to each other. They did not sleep for what seemed like hours.

Example O (cont.)

When my mother finally awoke, the sun was high. Patty was gone, and so was the skull. For the first time, my mother noticed the pear on the tree that grew near the house. The slightest breeze made it tap on the window. When Patty came back, she admitted that she had returned Pereshonts' skull to the grave. She would never admit anything about what had happened in the night.

"I want the skull to be there when our children go to look," she explained.

It was there when we went years later.

What appears to be the writer's feeling toward Patty?

(34)● Loving and amused
(9)○ Jealous
(23)○ Severely critical
(34)○ Scornful

About one-third of California's sixth-graders successfully identified the writer's attitude in the story. Student performance on the above question suggests that many students may need considerable instructional assistance in learning how to detect a writer's attitude or point of view. Moreover, uneven performance throughout the interpretive-critical comprehension skill area has prompted the members of the Reading Assessment Advisory Committee to observe that greater instructional emphasis is needed in the critical skills of interpreting, evaluating, and inferring from information and ideas stated in written material.

Reading Results for Grade Twelve

Test Scope

The reading section of the Survey of Basic Skills: Grade 12 consisted of 141 questions. The items were designed to assess a wide range of objectives discussed broadly in Framework in Reading for the Elementary and Secondary Schools of California and specified, with the help of the Reading Assessment Advisory Committee, in Test Content Specifications for California State Reading Tests (1975). As shown in Figure 2, both the objectives and the questions used to assess the achievement of the objectives fall into one of four reading skill areas: vocabulary, literal comprehension, interpretive-critical comprehension, and study-locational skills. Figure 2 also illustrates the relative degrees of emphasis placed upon each of the skill areas on the Survey of Basic Skills: Grade 12.

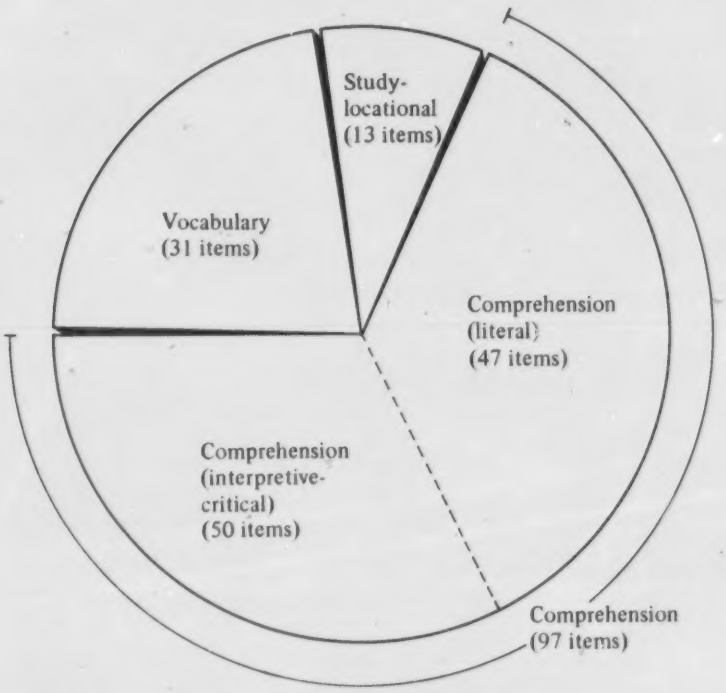


Fig. 2. Number of questions, by skill area, in the reading portion of the *Survey of Basic Skills: Grade 12*

Comparison of 1975-76 and 1976-77 Results, Grade Twelve

Twelfth-grade results on the total reading test and in each of the skill areas for 1975-76 and 1976-77 are presented in Table 5. The year-to-year changes in overall performance and skill area performance are also shown in Table 5.

Table 5

Reading Performance of California Twelfth-Grade Students on the Survey of Basic Skills: Grade 12

Skill area	Number of questions	Average percent correct		Gain (+) or loss (-) in score
		1975-76	1976-77	-4 -2 0 +2 +4
TOTAL READING	(141)	(64.1)	(63.6)	(-0.5)
Vocabulary	31	61.3	60.9	-0.4
Comprehension	97	64.5	63.9	-0.6
Literal	47	69.2	68.9	-0.3
Interpretive-Critical	50	60.1	59.3	-0.8
Study-Locational	13	68.4	67.2	-1.2

As the data in Table 5 indicate, twelfth-grade reading scores declined slightly in all skill areas from 1975-76 to 1976-77. The largest decline was in the study-locational area, which involves such study skills as the ability to use the dictionary, parts of a book, and reference materials.

Discussion and Analysis of Skill Area Results, Grade Twelve

While the members of the Reading Assessment Advisory Committee have stressed the importance of comprehension at all grade levels, they have emphasized it to the greatest extent at the twelfth grade. The composition of the twelfth-grade reading test reflects this emphasis. As one can see from Figure 2, 97 of the 141 reading questions measured either literal or interpretive-critical comprehension. Because of this emphasis the following discussion pertains only to the performance of California's twelfth-graders in the area of comprehension.

The comprehension questions were based upon passages drawn from a variety of materials including essays, poems, newspaper articles, advertisements, recipes, charts, and graphs. A number of comprehension questions followed each passage.

The questions were classified as either literal or interpretive-critical. The literal comprehension questions required students to identify explicitly stated elements in material, whereas the interpretive-critical comprehension questions required students to infer new interpretations or conclusions from explicitly stated material. All other things being equal, the additional reasoning required to answer the interpretive-critical comprehension questions typically renders them more difficult than the literal comprehension questions. Thus, the committee was not surprised that the average percent correct for the literal comprehension questions was 69.0, while the average percent correct for the interpretive-critical comprehension items was 59.3 (a 9.7 percentage point differential between the averages of the two categories).

A few actual test questions are included in the following discussion to illustrate the patterns that are characteristic of twelfth-grade students' performance in the literal and interpretive-critical comprehension skill areas. The reader may wish to refer to Appendix C for further descriptions of the skill areas tested, more detailed test results, and additional illustrative test questions.

Literal Comprehension. Even though the literal comprehension questions were generally easier for students than were the interpretive-critical comprehension questions, the scores on the 47 literal items varied from a high of 93 percent correct to a low of 23 percent correct.

The high in the range mentioned above is illustrated in the following question (Example A).

Example A

The insurance afforded is only with respect to such of the following coverages as are indicated by specific premium charge or charges. The limit of the company's liability against each such coverage shall be as stated herein, subject to all the terms of this policy having reference thereto.

A. BODILY INJURY LIABILITY		B. PROPERTY DAMAGE	C. MEDICAL PAYMENTS	D. (1) COMPREHENSIVE EXCLUDING COLLISION (2) PERSONAL EFFECTS	E. COLLISION	F. UNINSURED MOTORISTS		COVERAGES
Thousand Each Person	Thousand Each Occurrence	Thousand Each Occurrence	Each Person	(1) Actual Cash Value (2) $100	Actual Cash Value Less	Thousand Each Person	Thousand Each Accident	Limits of Liability
								Total Premium
$25	$50	$10	$1,000		$100 Deductible	$10	$20	
$37.80		$25.00	$9.00	$20.50	$45.10	$6.00		$143.40

What is the maximum amount per person for which this policy covers medical bills?

(93) ● $1,000 (3) ○ $10,000
(2) ○ $5,000 (2) ○ $25,000

The question in Example A required students to locate the column headed "Medical Payments" and the amount listed directly under "Each Person." Therefore, the task was primarily one of perceptually matching key words in the question with key words on the insurance form.

Most literal comprehension questions were more difficult than that in Example A. Whereas the question in Example A was based upon easily detectable information, the following item (Example B) was based upon a sentence "buried" in a four-paragraph passage with a ninth-grade readability level. Thus, the passage is typical of material that might be found in a ninth-grade science textbook and is illustrative of reading that students are often required to do in school. The question in Example B is a literal comprehension question based upon specific information in the second sentence of the third paragraph (underlined here for the reader's convenience).

Example B

Some members of the insect world have been equipped by nature with special weapons that protect them against their enemies, and others have been made distasteful or even poisonous. However, certain insects that are both tasty and weaponless have been given unusual and effective means for remaining alive. Among these means are protective coloration, mimicry, and protective resemblance.

Protective coloration blends the insect with his environment. For example, there are butterflies that, though strikingly beautiful in flight, show only dull colors when, flying wings folded, they rest on the bark of a tree or shrub.

Some butterflies, such as the monarch, are extremely distasteful to birds. The quite tasty viceroy, however, escapes harm by mimicking the offensive monarch.

The walking leaf avoids the hungry birds' attention by looking like a green leaf, and the butterfly known as the dead leaf is ignored because he so closely resembles the texture and shape of dead leaves on the branches that are his usual resting place.

Which, if any, is the major protection of the viceroy?

(7) ○ protective coloration
(72) ● mimicry
(9) ○ protective resemblance
(2) ○ repulsive appearance
(10) ○ None of these

On the question given above, 72 percent of the students correctly selected "mimicry." An analysis of the task and errors suggests that the other 28 percent of the population either failed to locate the sentence containing information about the viceroy or failed to discriminate between "mimicry" and other distractors, such as "protective coloration" and "protective resemblance."

The following test question (Example C) illustrates still another kind of difficulty presented in some of the literal comprehension items. The question is a deceptively simple one that asks students to identify four ingredients that are to be combined after the first step of the recipe. In fact, it is a question that demands fairly careful reading, or the reader is likely to select the fifth option.

Example C

ENGLISH MUFFINS

1 package active dry yeast
½ cup warm water
1½ cups milk, scalded
2 tablespoons sugar
2 teaspoons salt
¼ cup shortening
5¾ to 6 cups sifted all-purpose flour

Soften yeast in water. Combine next 4 ingredients; cool to lukewarm. Stir in *2 cups* flour; beat well. Add yeast; mix. Add enough of remaining flour to make a moderately stiff dough. Turn out on a lightly floured surface; knead till smooth (8 to 10 minutes). Place in lightly greased bowl, turning dough once. Cover; let rise till double (1¼ hours).

Punch down; cover and let rest 10 minutes. Roll to slightly less than ½ inch thick on lightly floured surface. Cut with a 3-inch round cutter. (Reroll edges.) Cover and let rise till very light (1¼ hours). Bake on top of range on medium hot greased griddle; turn frequently till done, about 30 minutes. Cool thoroughly. Split with a fork; toast on both sides. Serve at once. Makes 2 dozen.

After softening the yeast in the water, what four ingredients are combined next?

(33) ● Scalded milk, sugar, salt, shortening
(6) ○ Yeast, warm water, scalded milk, sugar
(3) ○ 2 cups flour, scalded milk, sugar, salt
(3) ○ 2 cups flour, warm water, scalded milk, sugar
(55) ○ None of these

A close study of the above item and its error pattern suggests that the large proportion (55 percent) of students who selected the fifth option probably failed to observe that the water was used in the first step of the recipe and were consequently looking for "water, milk, sugar, and salt"; since that particular combination of ingredients was not listed, they selected "None of these." After observing twelfth-grade students' performance on items like this one, the members of the Reading Assessment Advisory Committee surmised that many of California's twelfth-graders do not read carefully for detail.

Interpretive-Critical Comprehension. On the average the interpretive-critical comprehension questions were more difficult than the literal comprehension items. As was the case for the literal comprehension skill area, the range of scores on the interpretive-critical comprehension items was a wide one--from a high of 92 percent correct to a low of 23 percent correct. Thus, it is evident that the interpretive-critical comprehension questions included some easy, some moderately easy, and some difficult items. The question below (Example D) proved to be easy for most students.

Example D

I Skiing has recently become one of the more popular sports in the United States. Because of its popularity, thousands of winter vacationers are flying north rather than south. In many areas, reservations are required months ahead of time.

II I discovered the accommodation shortage through an unfortunate experience. On a sunny Saturday morning I set out from Denver for the beckoning slopes of Aspen, Colorado. After passing signs for other ski areas, I finally reached my destination. Naturally I lost no time in heading for the nearest tow. After a stimulating afternoon of miscalculated stem turns I was famished. Well, one thing led to another and it must have been eight o'clock before I concerned myself with a bed for my bruised and aching bones.

III It took precisely one phone call to ascertain the lack of lodgings in the Aspen area. I had but one recourse. My auto and I started the treacherous jaunt over the pass and back toward Denver. Along the way, I went begging for a bed. Finally a jolly innkeeper took pity and for only thirty dollars a night allowed me the privilege of staying in a musty, dirty, bathless room above his tavern.

The author's problem would have been avoided if he had

(4) ○ not tired himself out skiing.
(3) ○ taken a bus instead of driving.
(1) ○ looked for food as soon as he arrived.
(92) ● arranged for accommodations well ahead of his trip.

The question tested not only the students' overall comprehension of the author's problem but also their ability to infer how the problem might have been avoided in the first place. On this item 92 percent of the students responded correctly and thereby demonstrated their grasp of the primary message of the article. The performance of twelfth-grade students on items such as this one has led the Reading Assessment Advisory Committee to conclude that twelfth-graders are generally fairly skilled at identifying the main idea or explicit intent of an article.

In some written materials main ideas are implied rather than explicitly stated and must be inferred or interpreted from subtle clues. As one might expect, students encountered more difficulty on such questions, as illustrated by the following (Example E):

Example E

APPARENTLY WITH NO SURPRISE

Apparently with no surprise
To any happy flower,
The frost beheads it at its play
In accidental power.
The blond assassin passes on,
The sun proceeds unmoved
To measure off another day
For an approving God.

by Emily Dickinson

The MAIN idea of the poem is that

(3) ○ God is cruel.
(24) ○ forces in nature are kind.
(11) ○ the sun punishes frost.
(62) ● nature is indifferent.

Comprehending this poem involves certain aesthetic appreciation skills, such as understanding the figurative language "The blond assassin" and detecting the irony in the last line. On this item 62 percent of the students correctly equated the main idea of the poem with "nature is indifferent." The very great

difference between the correct answer and the other three options suggests that the remaining 38 percent of the students were very confused by the poem. This item illustrates a common difficulty demonstrated by students on a variety of other items that required them to use subtle clues in detecting the author's attitude. This apparent weakness was noted by the Reading Assessment Advisory Committee in the 1975-76 Annual Report. (See p. 28.)

The members of the committee have also noted that students seem to encounter even more difficulty on questions that require them to draw inferences from details (Example F).

Example F

The thirty years from 1455 to 1485 were a period of almost constant civil war between the supporters of two branches of the royal family—the house of Lancaster and the house of York. This fighting is usually called the War of the Roses, because the house of Lancaster had a red rose as its badge, and the house of York a white rose. At the end of it, Henry Tudor, who belonged to the Lancaster branch of the family, came to the throne as Henry VII. He married Elizabeth, who belonged to the York branch, and thus helped to heal the wounds of the prolonged conflict. Its chief result was the wiping out of many noble families and the reduction of the power of these lords and barons so that a king could have his own way without much trouble.

Henry VII's reign (1485–1509) was a time of rebuilding for England. He kept order in the country and strengthened the royal power by special courts and economical management. In his reign John Cabot made his famous trip across the Atlantic—the first of modern Europeans to see the continent of North America where Columbus had reached only the Carribean Islands. Henry's economy is seen in the entry in his diary when Cabot came back: "To hym that found the new isle, £10"—less than fifty dollars for discovering a continent—but of course Henry didn't know how important this discovery was going to be in the history of England.

According to the passage, Henry VII ruled at the time of

(30) ○ a revolution against the nobility.
(31) ○ the settlement of New England.
(26) ● the voyages of Columbus.
(13) ○ the destruction of the house of York.

The key to the question in Example F is contained in the underlined sentence above. One can see that answering this question correctly depended upon (1) reading carefully enough to notice the stated dates; (2) knowing the time of the voyages of Columbus; and (3) putting together the two pieces of information. As the item data reveal, just over one-fourth of the students chose the correct answer. The performance of twelfth-grade students on such items has led the Reading Assessment Advisory Committee to observe that California's high school seniors may be weak on tasks that require them to read carefully and draw inferences from details.

V. Written Expression Achievement for Grades Six and Twelve

Synopsis of Findings

Over the past few years, both sixth- and twelfth-grade written expression achievement scores in California have been below national norms. In 1976-77 the median sixth-grade student in California moved from the 49th to the 51st percentile--above the national average for the first time. The median twelfth-grade student in California, however, moved from the 34th to the 33rd percentile in written expression--17 points below the national average.

Every year since 1974-75, the members of the English Language Assessment Advisory Committee have reviewed the statewide written expression test results. By examining the 1976-77 scores for each question in the light of the maturity of most eleven- and seventeen-year-olds in written expression, the committee members discerned patterns of strength and weakness in the performance of students at both grade levels. However, the members of the committee have always qualified such interpretations with the reservation that some aspects of instruction and learning in the language arts are not being tapped by objective testing. Thus, the committee's judgments were restricted to only those aspects of written expression that are amenable to measurement through multiple-choice questions. While the discussion of skill-area strengths and weaknesses is based upon the committee's judgments, the Department of Education accepts full responsibility for the interpretations in this report.

After reviewing the written expression results for grade six students, the English Language Assessment Advisory Committee concluded that sixth-graders displayed a respectable command of the following four written expression skill areas:

- Word forms (selecting the appropriate suffix for a word in a given sentence)
- Standard English usage (selecting for a sentence the verb or pronoun which reflects standard English usage)
- Sentence recognition (recognizing complete sentences, fragments, run-ons, and normal English word order in sentences)
- Sentence manipulation (selecting the most effective sentence or sentence element)

On the other hand, the committee judged that increased instructional emphasis is needed in the following areas at the upper elementary level:

- Language choices (selecting the most vivid verb or specific noun for a given sentence; identifying attitudes conveyed by words or groups of

words; identifying the audience intended by the author of a prose passage or letter)

- Capitalization (recognizing words in a sentence which should be capitalized)
- Punctuation (identifying errors in the use of the period, question mark, exclamation point, comma, apostrophe, and quotation marks)

The members of the committee were less pleased with twelfth-grade students' performance in written expression than they were with the performance of sixth-graders. The committee judged that the performance of twelfth-grade students was strong in the following skill areas:

- Word forms (selecting the correct inflectional suffix for a word in a sentence)
- Sentence recognition (discriminating between complete and incomplete sentences)
- Paragraphs (identifying irrelevant material in a paragraph; selecting the summary statement of a paragraph; and sequencing elements within a paragraph)

The committee members noted, however, that increased instructional emphasis is needed in the following areas at the secondary level:

- Word forms (using the full resources of the dictionary)
- Language choices (determining the most specific or general word from a list of semantically related words; inferring the implied attitude of a writer from the language choices used in a passage)
- Sentence manipulation (rejecting awkward, stilted, and wordy sentences in favor of economical and direct statements)
- Paragraphs (recognizing the use and purpose of transitional words in paragraphs; identifying inconsistent verb tenses from sentence to sentence within a paragraph)
- Punctuation and capitalization (recognizing the basic conventions of punctuation and capitalization)

The pattern of strengths and weaknesses in twelfth-grade students' written expression performance continues to parallel a finding, reported by the National Assessment of Educational Progress, that while many seventeen-year-olds have mastered the basics of written English, they seldom go beyond the basics.

Written Expression Results for Grade Six

Test Scope

The written expression section of the Survey of Basic Skills: Grade 6 consists of 128 questions. The items were selected to assess a broad array of objectives compiled by the English Language Assessment Advisory Committee and published in Test Content Specifications for the Survey of Basic Skills: Written Expression and Spelling, Grades Six and Twelve (Sacramento: California State Department of Education, 1975). Both the objectives and the items used to assess the objectives fell into one of seven major skill areas: word forms, language choices, standard usage, sentence recognition, sentence manipulation, capitalization, and punctuation. The relative degree of emphasis assigned to each of the skill areas on the Survey of Basic Skills: Grade 6 is presented graphically in Figure 3.

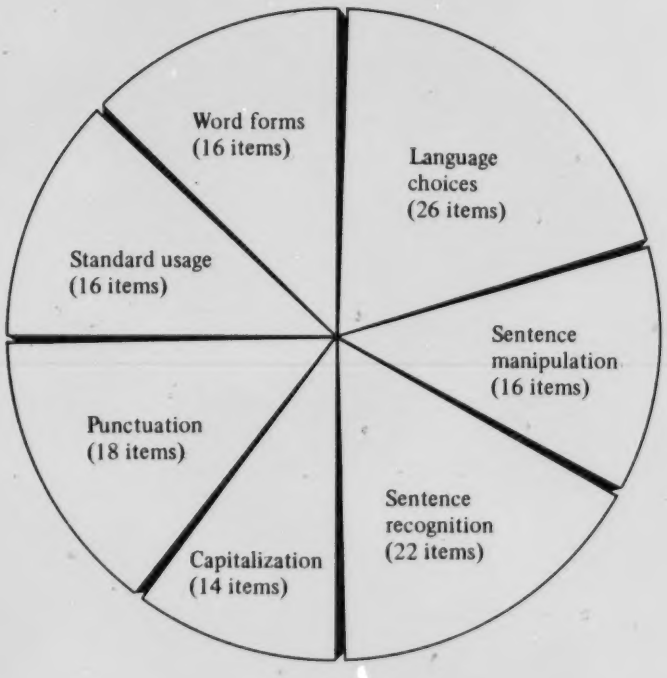


Fig. 3. Number of questions, by skill area, in the written expression section of the *Survey of Basic Skills, Grade 6*

Comparison of 1975-76 and 1976-77 Results, Grade Six

The results of sixth-grade performance on the total written expression test and in each of the skill areas for 1975-76 and 1976-77 are presented in Table 6. Year-to-year changes in overall performance and in skill area performance are shown in the table.

Table 6

Written Expression and Spelling Performance of California Sixth-Grade Students on the Survey of Basic Skills: Grade 6

Skill area	Number of questions	Average percent correct		Gain (+) or loss (-) in score
		1975-76	1976-77	-4 -2 0 +2 +4
TOTAL WRITTEN EXPRESSION	(128)	(62.5)	(63.6)	(+1.1)
Word forms	16	82.4	82.3	-0.1
Standard usage	16	75.3	75.3	0.0
Language choices	26	54.4	56.5	+2.1
Sentence recognition	22	62.3	63.0	+0.7
Sentence manipulation	16	61.7	62.6	+0.9
Capitalization	14	57.4	58.4	+1.0
Punctuation	18	52.4	52.5	+0.1
TOTAL SPELLING	(64)	(63.6)	(63.6)	(0.0)
Relationships	35	58.1	58.1	0.0
Word forming	29	70.2	70.3	+0.1

The data in Table 6 reveal that the written expression scores of sixth-grade students increased 1.1 percent in 1976-77. With the exception of word forms and standard usage, student performance improved slightly in all of the written expression skill areas. The greatest increases were in language choices (2.1 percent correct), capitalization (1.0 percent correct), sentence manipulation (0.9 percent correct) and sentence recognition (0.7 percent correct).

Members of the English Language Assessment Advisory Committee reviewed the 1976-77 assessment results as they have done for the two previous years. The committee members judged the adequacy of student performance in light of the inherent difficulty of the skills, the particular items that were used to measure each skill, and changes in performance from 1975-76 to 1976-77.

Actual test questions are provided in the following discussion to illustrate the committee's conclusions about sixth-grade students' performance in the various written expression skill areas. For each illustrative question the percent of the students who selected each response is indicated in parentheses before each response, and the bubble next to the correct answer is shaded. Additional descriptions of the skill areas tested, more detailed test results, and illustrative test questions are included in Appendix D of this report.

Word Forms. The 16 word form questions required the students to select the appropriate suffix (-ed, -ing, -s, -ly, -er, -est, -'s) for a word in a given sentence. The members of the English Language Assessment Advisory Committee expected this kind of task to present little difficulty to native speakers of English. Their expectation was confirmed; on 12 of the 16 questions, the average percent scores ranged from 80 to 95 percent. Examples A and B illustrate two "typical" word form questions.

Example A

The explorers had _____ a new world.

(2) ○ discovery
(1) ○ discovering
(95) ● discovered
(2) ○ discovers

Example B

She was struggling _____.

(14) ○ wild
(81) ● wildly
(3) ○ wilder
((2) ○ wildest

While most sixth-grade students handled this type of question successfully, many students did experience difficulty with a few word form items. For example, almost half of the sixth-graders selected an inappropriate suffix for the following sentence.

Example C

"That's all he talks about," the kids would say_____.

(34) ○ grumpy
(5) ○ grumpiest
(5) ○ grumpier
(56) ◕ grumpily

An examination of the error pattern for Example C shows that approximately one-third of the students selected "grumpy," a word that is fairly similar in sound to the adverbial form "grumpily" which is the correct response. After reviewing the percent correct scores and error patterns on the entire cluster of word form questions, members of the English Language Assessment Advisory Committee concluded that sixth-graders' performance in this skill area was consistent with their expectations.

Standard Usage. Like the word form questions, most of the 16 standard usage questions required the students to select the appropriate word for a given blank in a sentence. In the standard usage area, however, most of the items required the students to select either a verb or pronoun usage which reflects standard English usage. At least 80 percent of the students selected the correct English usage on 11 of the 16 standard usage questions. Examples D (pronoun usage) and E (verb usage) are "typical" standard usage questions.

Example D

_____are good friends.

(90)● Daisy and I
(10)○ Daisy and me

Example E

The doctors_____everything possible.

(82) ● did
(18) ○ done

While most standard usage questions yielded scores of 80 to 90 percent correct, as in Examples D and E, a few items, such as Example F, proved to be more difficult for students.

Example F

_____are throwing a party.

(61)○ Us girls
(39)● We girls

On this question, just over one-third of California's sixth-graders correctly selected "We girls" instead of "Us girls" for a nominative position in a sentence. Since student performance on standard English usage questions is affected so greatly by the linguistic background of the home, members of the committee judged that the overall performance of sixth-graders in this area was quite good.

Language Choices. The 26 language choice questions assessed students' sensitivity to the special effects created by particular word choices in written language. These included (1) selecting the most vivid verb or specific noun for a sentence; (2) identifying attitudes conveyed by words or groups of words; and (3) identifying the audience intended by the author of a prose passage or letter.

Items which required students to select the most vivid verb or specific noun for a sentence are illustrated by Examples G and H.

Example G

Pretend that you are writing a story. Fill in the oval next to the word that will give your reader the best picture of what's happening.

EXAMPLE:

The snake _____ across the grass.

○ moved
● slithered
○ went

The logs on the fire popped and _____.

(66) ● hissed
(31) ○ burned
(3) ○ heated

Example H

Pretend that you are writing a story. Fill in the oval next to the word or words that will give your reader the clearest, most specific and concrete picture.

EXAMPLE:

At the bottom of her lunch sack she found _____.

○ some food
● a carrot
○ a snack
○ a vegetable

I could smell _____ cooking.

(65) ● bacon and eggs
(9) ○ a hot meal
(10) ○ some good food
(16) ○ breakfast

While sixth-grade students' performance on the language choice questions varied considerably from question to question, improvement was shown on over half of the items.

Sometimes in writing, other considerations govern the appropriateness of particular word choices, such as the audience for whom one is writing (Example I) and the attitude(s) one wishes to convey (Example J).

Example I

My dumb little brother let my pet snake loose. I was ready to wring his neck.

The writer is probably writing

(2) ○ to a business.
(14) ○ for a science assignment.
(3) ○ to a newspaper.
(81) ● to a friend.

Example J

Which of the following best shows that Martin felt bad?

"I can't go to school today," Martin _____.

(75) ● groaned
(5) ○ stated
(13) ○ said
(7) ○ declared

Table 6 shows that while language choices was the second most difficult written expression skill area for sixth-graders, it was the only one in which the students' average percent correct score improved more than 2 percentage points from 1975-76 to 1976-77. After reviewing the results in language choices item by item, the members of the English Language Assessment Advisory Committee were pleased with the improvement shown but indicated that all of the language choice subskills, including sensitivity to audience, should receive continuing instructional emphasis.

Sentence Recognition. The 22 sentence recognition items required the students to discriminate between English and non-English word order, identify complete or incomplete sentences, recognize run-on sentences, and identify inappropriate form class words. Of these, the easiest questions were those that required the students to recognize non-English word order, as in Example K.

Example K

Fill in the oval next to the word group which is not a sentence.

(3) ○ The young boy wrote the story during the test at school.
(4) ○ During the test at school the young boy wrote the story.
(88) ● The story wrote the young boy during the test at school.
(5) ○ The story was written by the young boy during the test at school.

The scores on the other sentence recognition questions in this particular sub-skill area were very homogeneous, varying only from 86 to 88 percent correct.

The members of the English Language Assessment Advisory Committee have stated that discriminating between English word order and non-English word order should be an easy task for native speakers of English. Example K illustrates that this was the case for most (88 percent) of the sixth-graders tested.

However, other questions in the area of sentence recognition proved to be more difficult for students. For example, some questions required the students to determine the number of sentences contained in a series of two or more run-on sentences, as in Example L.

Example L

In the following items, there are two or more sentences which need to be separated from each other with periods and capital letters. Fill in the oval next to the number which tells how many SENTENCES there should be.

The bus will stop on this corner my house is just up the street and over the hill it's the red one.

(8) ○ 1 (62) ● 3
(20) ○ 2 (10) ○ 4

Because of the inherent difficulty of the task in Example L, the members of the committee were not disappointed with the percent of students who responded correctly on this and similar items.

Other sentence recognition questions required the students to discriminate between complete and incomplete sentences. Examples M and N illustrate typical performance on such items.

Example M

Fill in the oval next to the group of words which needs more words to make it a complete sentence.

(12) ○ They brought a present.
(18) ○ We are happy.
(9) ○ Barry is not here.
(61) ● In the dark of the night.

Example N

Fill in the oval next to the word group which is a complete sentence.

(5) ○ Happily skipping down our street.
(31) ● I did it.
(20) ○ Happily singing and skipping down our street.
(44) ○ Skipping down our street and singing happily.

An analysis of both of the above items and their error patterns suggests that many students relied more heavily upon the length and sound of a word cluster than upon its structural components in determining whether or not a sentence was complete.

Table 6 shows that sixth-grade students made gains of .7 percent correct in the area of sentence recognition. Some members of the English Language Assessment Advisory Committee expressed satisfaction with student performance in this area; however, a few members of the committee concluded that performance levels on items such as Example N indicate that upper elementary students need increased instructional assistance in learning to recognize sentences as a fundamental skill of written expression.

Sentence Manipulation. On the 16 sentence manipulation items, the students were asked to select the most effective sentence or sentence element and to expand a sentence by modifying elements. The average percent correct for this category was 62.6, which was .9 percent higher than the average in 1975-76.

There was a considerable spread of performance (45 to 85 percent correct) on the nine questions that required the students to select the most effective statement of an idea. Both the high and low percent correct scores are presented below in Examples O and P

Example O

Fill in the oval next to the sentence which is the simplest, least wordy, and easiest to understand.

(10) ○ The popcorn was burned by Mary in the kitchen.
(85) ● Mary burned the popcorn in the kitchen.
(3) ○ In the kitchen was Mary who burned the popcorn.
(2) ○ Burning the popcorn in the kitchen was Mary.

Example P

(15) ○ The man who took the money stashed the money in the closet.
(45) ● The thief stashed the loot in the closet.
(6) ○ The loot was hidden by the man in a small room with a door on it.
(34) ○ The money which had been stolen was stashed in the closet by the thief.

The English Language Assessment Advisory Committee expressed satisfaction with sixth-grade performance on these and other questions that required the students to discriminate between clear, concise statements and wordier formulations of the same idea. The members of the committee noted that scores were generally lower on the sentence modification items that involved expanding a sentence through the use of modifying elements in response to a particular information need. Such an item is provided in Example Q.

Example Q

Fill in the oval next to the group of words that best answers the question.

The man ate his supper.

How would you change this sentence if you wanted to describe *how the man ate*?

(31) ○ The hungry man ate his supper.
(51) ● The man ate his supper greedily.
(8) ○ The man ate his hot supper.
(10) ○ The man ate his supper of pork and beans.

The low percent correct scores in this subskill area were consistent with the expectations of the English Language Assessment Advisory Committee since sixth-graders are still developing maturity in their ability to modify words and structures.

Capitalization. The 14 capitalization questions required students to recognize words in a sentence that should be capitalized (such as the beginning word of a sentence, names of persons and places, days of the week, and months of the year). The majority of capitalization items yielded scores that were quite homogeneous (between 50 and 65 percent correct). Example R is a "typical" capitalization question.

Example R

In the following sentences, you are to look for mistakes in capitalization. When you find a mistake, fill in the oval next to the line with the mistake. If there is no mistake, fill in the fourth oval.

(59) ● we are learning
(5) ○ about all the planets
(15) ○ in our solar system.
(21) ○ (No mistakes)

The members of the English Language Assessment Advisory Committee indicated that they would like to see better performance on items such as Example R. However, they were somewhat encouraged by the slight average gain (1.0 percent correct) that was made in the area of capitalization.

Punctuation. There was almost no change (.1 percent increase) in the area of punctuation, which continued to be the most difficult skill area for sixth-graders with an average percent correct score of 52.5. The 18 punctuation questions required the students to recognize errors in the use of the period, question mark, exclamation point, comma, apostrophe, and quotation marks. Examples S, T, and U illustrate the range of student performance on the punctuation items.

Example S

The following sentences may have a mistake in punctuation (periods, commas, apostrophes, etc.). When you find a mistake, fill in the oval next to the line with the mistake. If there is no mistake, fill in the fourth oval.

(4) ○ My favorite snacks
(7) ○ to eat after school
(75) ● are oranges apples and peanuts.
(14) ○ (No mistakes)

Example T

(8)○ Fishing for bass can be plenty
(56)● of fun but I would rather go
(8)○ swimming when the day is hot.
(28)○ (No mistakes)

Example U

(17) ○ "Run, Pedro, run!" we
(13) ○ shouted. But Pedro acted
(32) ● as if he hadnt heard us.
(38) ○ (No mistakes)

Members of the committee expressed continued concern over sixth-grade performance in the area of punctuation, since the mastery of such basic skills is important if students are to proof-read their own writing effectively.

Written Expression Results for Grade Twelve

Test Scope

The written expression section of the Survey of Basic Skills: Grade 12 consists of 142 questions. The items were selected to assess a wide variety of objectives compiled by the English Language Assessment Advisory Committee and published in Test Content Specifications for the Survey of Basic Skills: Written Expression and Spelling, Grades Six and Twelve. Both the objectives and the items used to assess the achievement of the objectives fell into one of six major skill areas: word forms, language choices, sentence recognition, sentence manipulation, paragraphs, and capitalization and punctuation. The emphasis placed upon each of the skill areas in the Survey of Basic Skills: Grade 12 is shown in Figure 4.

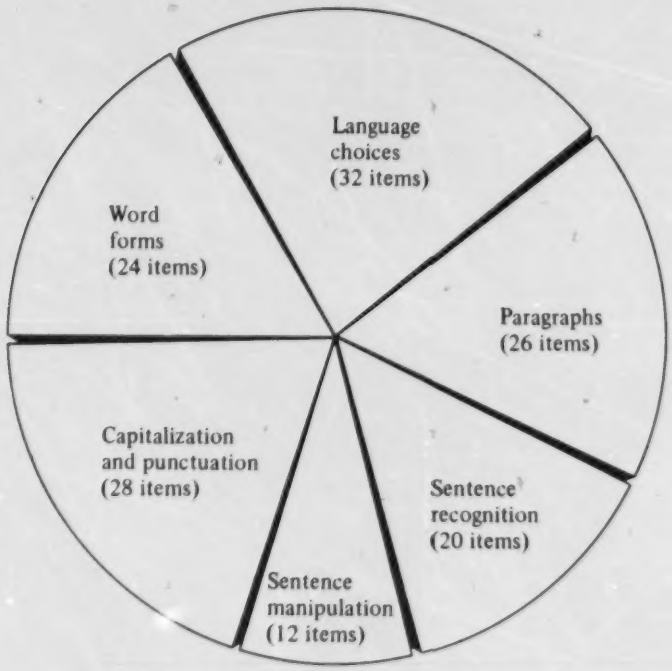

Language choices (32 items)
Paragraphs (26 items)
Sentence recognition (20 items)
Sentence manipulation (12 items)
Capitalization and punctuation (28 items)
Word forms (24 items)

Fig. 4. Number of questions, by skill area, in the written expression section of the *Survey of Basic Skills: Grade 12*

Comparison of 1975-76 and 1976-77 Results, Grade Twelve

The results of twelfth-grade students' performance on the total written expression test and in each of the skill areas for 1975-76 and 1976-77 are presented in Table 7. Year-to-year changes in overall performance and in skill area performance are also shown in the table.

Table 7

Written Expression and Spelling Performance of California Twelfth-Grade Students on the Survey of Basic Skills: Grade 12

Skill area	Number of questions	Average percent correct		Gain (+) or loss (-) in score
		1975-76	1976-77	-4 -2 0 +2 +4
TOTAL WRITTEN EXPRESSION	(142)	(62.3)	(61.9)	(-0.4)
Word forms	24	72.6	72.1	-0.5
Language choices	32	66.9	66.7	-0.2
Sentence recognition	20	67.3	67.7	+0.4
Sentence manipulation	12	42.9	42.9	0.0
Paragraphs	26	59.9	59.1	-0.8
Capitalization and punctuation	28	54.6	54.3	-0.3
TOTAL SPELLING	(72)	(68.0)	(66.8)	-1.2

The data in Table 7 show that the performance of twelfth-grade students in written expression declined slightly. Slight decreases were noted in all of the skill areas except sentence recognition and sentence manipulation.

Discussion and Analysis of Skill Area Results, Grade Twelve

Members of the English Language Assessment Advisory Committee reviewed the 1976-77 twelfth-grade written expression results as they did for grade six. The committee members again judged the adequacy of student performance in light of the inherent difficulty of each skill, the particular items used to assess each skill, and changes in performance from 1975-76 to 1976-77.

Actual test questions are presented in the following analysis to describe the skill areas as completely as possible and to illustrate the committee's conclusions

about twelfth-grade students' performance in written expression. For each example the percent of students who marked each response is indicated in parentheses before each response, and the bubble next to the correct answer has been shaded. Appendix E contains additional descriptions of the skill areas tested, more detailed test results, and additional illustrative test questions.

Word Forms. The 24 word form questions required the twelfth-graders to perform a variety of operations with words. Eleven of the items asked students to select the form of the word that was grammatically correct in a given sentence. The vast majority of twelfth-graders successfully handled items of this type as shown in Example A.

Example A

Select the form of the word which best completes the following sentence.

The girl did her work very _____.

(1) ○ cheerfulness (6) ○ cheerful
(92) ● cheerfully (1) ○ cheer

In spite of the fact that scores declined in this subskill area, the committee judged that twelfth-graders were still demonstrating mastery in the placement of suffixes. The committee also noted that twelfth-grade performance was stable on items requiring students to discriminate between form class words and structure words. Example B illustrates this subskill.

Example B

For the following items, select the one word which DOES NOT belong with the others.

(85) ● hand (6) ○ though
(3) ○ and (6) ○ for

Of greater concern to the committee, however, was twelfth-grade performance on a variety of dictionary usage questions. Example C is a typical dictionary usage item.

Example C

Read the dictionary entry below and answer the related questions.

cop · per *(kop'er), n.* [AS. *coper, copor,* fr. L. *cuprum,* fr. *Cyprus,* anciently renowned for its copper mines.] **1.** A common metal, reddish in color, and one of the best conductors of heat and electricity. **2.** Something made of copper: a copper (or bronze) coin; a large boiler, as for laundry or for cooking (now usually made of iron). **3.** The color of copper.—*v. t.* **1.** To cover, coat, or sheathe with copper. **2.** U.S. To bet against; — orig. used in faro. — **cop · per,** *adj.*

The dictionary entry above indicates that "copper" should be pronounced with the stress

(9) ○ on both syllables.
(69) ● on the first syllable only.
(4) ○ on the second syllable only.
(18) ○ between the first and second syllables.

As the item data reveal, 31 percent of the students failed to determine from a pronunciation key which syllable in a word should receive the stress. The scores on items such as Example C led the English Language Assessment Advisory Committee to conclude that additional instructional emphasis which would enable students to tap the full resources of the dictionary is needed at the secondary level.

Language Choices. The 32 language choice questions assessed the students' sensitivity to the effects of particular word choices in a variety of contexts. Thirteen of the questions required the students to identify the attitude or tone conveyed by words, sentences, and entire passages. Student performance on these questions ranged from a low of 30 percent correct to a high of 83 percent correct.

Example D is a typical language choice item that most twelfth-graders marked correctly.

Example D

Which of the following words conveys a NEUTRAL meaning when describing a person's acting ability?

(10) ○ ham
(3) ○ star
(81) ● performer
(6) ○ genius

Some items required the students to make finer discriminations than that required in Example D and were consequently more difficult. Less than two-thirds of the twelfth-graders selected the best language choice on the following question.

Example E

Dr. Henry J. Heimlich, _____ at Jewish Hospital in Cincinnati, described the technique in the journal *Emergency Medicine* and invited physicians to try it in real emergencies.

Which of the following terms is most respectful in the context of the above sentence?

(62) ● director of surgery
(1) ○ chief blade
(17) ○ practitioner
(20) ○ head doctor

Students encountered even more difficulty on items that required them to "go beyond" the literal meaning and distinguish between the attitude of the writer and the attitude of the character being described. Less than one-third of the students were able to handle the discriminating task presented in Example F.

Example F

Fledgeby knocked and rang, and Fledgeby rang and knocked, but no one came. Fledgeby crossed the narrow street and looked up at the house windows, but nobody looked down at Fledgeby. He got out of temper, crossed the narrow street again, and pulled the housebell as if it were the house's nose and he were taking a hint from his late experience. His ear at the keyhole seemed, then, at last, to give him assurance that something stirred within. His eye at the keyhole seemed to confirm his ear, for he angrily pulled the house's nose again, and pulled and pulled and continued to pull, until a human nose appeared in the dark doorway.

Which of the following words best describes the attitude of the writer toward the incident he is describing?

(7) ○ disapproval (62) ○ anger
(1) ○ happiness (30) ● amusement

An analysis of the error pattern on the above item suggests that the majority of the students miscued on the underlined sentence (emphasized here for the reader's convenience), which described Fledgeby's attitude rather than that of the writer. In so doing, they overlooked the subtle amusement conveyed by the author with a variety of word choices throughout the passage (such as, "the house's nose" and "until a human nose appeared in the dark doorway"). The members of the committee concluded that students need increased instructional assistance in learning to recognize how word choices can be manipulated to convey particular attitudes in writing.

Ten of the language choice questions required the students to determine the most specific or general word from a list of semantically related words. The members of the English Language Assessment Advisory Committee noted that the performance of twelfth-graders in this area continued to be disappointing. Examples G and H illustrate an easy and a difficult question, respectively.

Example G

Which of the following is the most GENERAL?

(4)○ sports car (6)○ sedan
(11)○ bus (79)● passenger vehicle

Example H

Identify the clearest, most specific statement.

(12)○ James Baldwin's *Go Tell It on the Mountain* is a novel of Harlem ghetto life.
(15)○ James Baldwin's *Go Tell It on the Mountain* is a novel about a family in the Harlem ghetto.
(43)● James Baldwin's *Go Tell It on the Mountain* is a novel of the Grimes family in the Harlem ghetto.
(30)○ James Baldwin's *Go Tell It on the Mountain* is a thundering novel depicting Harlem ghetto life.

Student performance in this skill area is a matter of concern because if students are not able to recognize the difference between the general and specific in language, as in Example H, for instance, it seems unlikely that they will be able to achieve appropriate levels of specificity in their own writing.

Another key factor in determining the effectiveness of particular language choices in written expression is an awareness of the communication needs of the audience. Thus, a cluster of questions required the students to identify the audience intended by the author of a particular passage. On four of the five items measuring this skill, scores ranged from 82 to 96 percent correct. Example I illustrates a typical "audience" question.

Example I

The public school is taking the rap for society's ills. The basic institutions of society are home, school, and church. There is widespread denigration of religion; the home has been fractured by television, lowered standards of conduct, compromised moral values, a preoccupation with materialism, and working mothers.

Today's parents have declined their responsibilities in favor of Dr. Spock, child psychologists and a host of liberal freethinkers. They send their children to school ill-mannered and undisciplined. They cannot openly face the fact their children do not learn because of the way they were initially raised.

School is the parents' last resort in a vain attempt to instill values that should have been taught at home. Schools have not failed. Parents have failed.

The letter to the editor is really intended to reach which of the following audiences?

(3) ○ the editor of the paper
(4) ○ students
(2) ○ Dr. Spock
(91) ● parents

As a result of the high percent correct scores on such items, the members of the English Language Assessment Advisory Committee were generally pleased with twelfth-grade students' performance in this important subskill area.

Sentence Recognition. The 20 sentence recognition questions assessed students' awareness of sentences, sentence patterns, parallel structure, and subject-verb agreement. The percent correct scores varied with the difficulty of the question. For example, almost all the students (86 percent) successfully identified the incomplete sentence in Example J.

Example J

Identify the group of words which is incomplete or needs additional words to complete the meaning.

(3) ○ Sam is always hungry.
(87) ● The hurried sounds of footsteps.
(6) ○ The player knocked him down.
(4) ○ He crashed through the door.

However, fewer students accomplished this task on the more discriminating question below.

Example K

Identify the group of words which is incomplete or needs additional words to complete the meaning.

(69) ● The barking dog in the driveway.
(6) ○ It is humid.
(20) ○ Peace continues.
(5) ○ There is the mail.

The error pattern for Example K suggests that many students relied more heavily upon the length of a word cluster than upon its structural components in determining whether a sentence was complete or incomplete. It may be that insensitivity to the grammatical structure of a sentence contributed to the confusion displayed by students on the following question as well.

Example L

Identify the group of words which DOES NOT correctly complete the following sentence.

Each of the men _____.

(22) ○ has his work cut out for him
(17) ○ shows great talent
(19) ○ wishes for a chance to perform
(42) ● have much work to do

Example L involved selecting a verb that would agree in number with the subject of the sentence. The success of students in doing so, however, was dependent upon their first recognizing the word "Each" as the subject of the sentence. Many of those who selected the incorrect options (58 percent) may have incorrectly perceived "men" to be the subject of the sentence.

The members of the English Language Assessment Advisory Committee judged that twelfth-grade students' performance on the item in Example M also reflected a lack of analytical awareness of sentence structure.

Example M

Select the sentence which follows the basic pattern of the model.

Model: The test, although long, was easy, at least for those who had studied.

(8) ○ Bill finished the typing job, even though he had to work through lunch to complete it.

Example M (cont.)

(24) ○ Although the typing job was long, it was not complicated, so Bill stayed to finish it during his lunch.
(46) ● The typing job, though not difficult, was unusually long, especially for Bill.
(22) ○ A long but uncomplicated typing job was completed by Bill.

The above item required the students to identify the sentence that was parallel in structure to the model. Because of the difficulty of the task, the English committee members were not surprised that only 46 percent of the students marked the question correctly. Moreover, the committee members were encouraged by the larger proportion of students who successfully rejected the nonparallel structure in the following item.

Example N

Which phrase CANNOT be used to complete the sentence?

Mary most enjoys playing the flute, writing poems, dancing fast, and _____.

(8) ○ dating her many admirers
(10) ○ going out on dates
(75) ● to go out on dates
(7) ○ having men ask her out

After reviewing twelfth-grade performance on the entire cluster of sentence recognition items, the members of the English Language Assessment Advisory Committee concluded that twelfth-grade students' performance was generally strong on most of the basic sentence recognition and subject-verb agreement questions even though many students were insensitive to the grammatical structure of sentences.

Sentence Manipulation. The 12 sentence manipulation questions required the students to perform a variety of mental operations with sentences. This particular skill area remains as the most difficult one in written expression for twelfth-graders with an average percent correct score of 42.9. Six questions required the students to select the most effective statement of an idea. As was noted in past years, twelfth-graders consistently rejected terse, economical statements in favor of wordy expressions of the same idea. Example O illustrates this problem.

Example O

Below are four sentences expressing the same general thought. Mark the sentence which expresses the thought MOST EFFECTIVELY.

(50) ○ She spoke to me in a very cool manner when we met each other yesterday.

(12) ○ When we met yesterday, I was spoken to in a very cool manner by her.

(15) ○ Her manner was very cool when meeting and speaking to me yesterday.

(23) ● Yesterday she greeted me coolly.

Apparently, over three-fourths of California's twelfth-graders equated effectiveness with the wordy, passive, and/or awkward statements.

The students also encountered difficulty on a variety of items that required them to identify the sentence that most effectively combined several pieces of information. This type of sentence-combining task is illustrated by Example P.

Example P

1. Ships' logs bring back the danger of the whaling voyages.
2. Ships' logs bring back the monotony of the whaling voyages.
3. Ships' logs bring back the occasional excitement of the whaling voyages.
4. Ships' logs were usually kept by the first mate.

Which of the following sentences most effectively combines the information in the above four sentences?

(23) ○ Ships' logs bring back the danger, monotony, and occasional excitement of the whaling voyages and were usually kept by the first mate.

(9) ○ Ships' logs bring back the whaling voyages and the danger, monotony, and occasional excitement, usually kept by the first mate.

(59) ● Ships' logs, usually kept by the first mate, bring back the danger, monotony, and occasional excitement of the whaling voyages.

(9) ○ Usually kept by the first mate of the whaling voyages, ships' logs bring back the danger, monotony, and occasional excitement.

While the above question proved to be somewhat easier than that in Example O, over 40 percent of the students still failed to select the most effective statement.

Another sentence manipulation task required the students to manipulate sentences so as to achieve a particular relationship between them. Example Q is such an item.

Example Q

The following two sentences can be combined in a number of ways:

A. You can call Mr. Brown for a recommendation.
B. Mr. Brown is the owner of the B & B Market.

Which of these combinations reduces sentence B to a modifier?

(55) ● You can call Mr. Brown, owner of the B & B Market, for a recommendation.
(11) ○ You can call Mr. Brown for a recommendation; he is the owner of the B & B Market.
(6) ○ You can call Mr. Brown for a recommendation; because he is the owner of the B & B Market.
(28) ○ You can call the owner of the B & B Market, Mr. Brown, for a recommendation.

On the 12 sentence manipulation items (illustrated by Examples O, P, and Q) scores ranged from 23 percent correct to 59 percent correct. Thus, the members of the English Language Assessment Advisory Committee concluded as they did in past years, that California's twelfth-graders need more experience with sentence manipulation activities in order to help them (1) learn to equate effectiveness with economy of expression; and (2) gain control of sentence structure in their own writing.

Paragraphs. Twenty-six questions required students to perform a variety of mental operations on still larger units of discourse such as paragraphs and passages. As one might expect, the paragraph skill area was one of the most difficult portions of the test; the average percent correct score for this area was 59.1. Again, performance varied with the difficulty of the subskill and with the particular test item assessing it.

One cluster of questions that most students handled successfully involved identifying irrelevant material in a paragraph. Example R illustrates both the nature of such a task and the typical level of mastery in this area.

Example R

(1) During the present century, our country has made tremendous progress in helping people to live healthier and longer lives. (2) We have more college graduates now than ever before. (3) In 1900, a 10-year-old child could expect to live until he was about 55 years old. (4) Today, a 10-year-old can expect to reach the age of 75. (5) During most of their lives, people are generally much healthier than they used to be. (6) Since people are now living longer, however, it is only natural that more people suffer from illnesses that come with old age.

Identify the sentence which is unrelated to the others.

○1	●2	○4	○5
(2)	(92)	(2)	(4)

The members of the committee were pleased that in most cases the majority of twelfth-graders could recognize sentences that departed from the primary topic of a paragraph. Moreover, the members of the committee judged that twelfth-graders had maintained a satisfactory level of performance on questions requiring them to identify the most effective summary statement of one or more paragraphs. Example S is a typical item of this nature.

Example S

A sudden, sharp bear-hug is saving the lives of people starting to choke to death on food. It is also rescuing some drowning victims.

The pressure from the hug causes food "to pop out like a cork from a champagne bottle," says the surgeon who developed the technique. When applied to drowning persons, "the water gushes out of the mouth."

Dr. Henry J. Heimlich, the director of surgery at Jewish Hospital in Cincinnati, described the technique in the journal *Emergency Medicine*, and invited physicians to try it in real emergencies.

He obviously couldn't test it on humans by putting them into danger, but he had shown the method worked on laboratory dogs.

Now he has some thirty letters telling of lives apparently saved—a peppermint dislodged from the windpipe of a twenty-two month old, a piece of roast beef from the throat of a nine-year-old girl, a Korean woman saved by a U.S. Army medical corpsman in Korea.

Example S (cont.)

Select the sentence below which most effectively summarizes the first two paragraphs.

(65) ● A sudden, sharp bear-hug can help save the lives of people choking on food or, sometimes, of people drowning.
(20) ○ If you squeeze people who are choking on food or drowning, the food or the water gushes out "like a cork from a champagne bottle."
(12) ○ A surgeon has developed techniques for giving a bear-hug to people who are choking on food.
(3) ○ Some people who are drowning may be saved by a quick, bear-like hug.

As the item data reveal, 35 percent of the students incorrectly selected either the overly specific and less important statement in the second option or the less comprehensive statements in the third and fourth options.

Another important skill in writing paragraphs is the ability to put sentences into a logical order so as to signal sequences in time, action, or logic. Example T is a question that assessed this ability.

Example T

The following paragraph may not be in a logical sequence. Read the sentences and select the best order for them.

(1) Rain, scooped by the violent wind, pelted against my bedroom window. (2) The wind howled and swept around the corner of our house. (3) I lay alone in bed frightened by what was happening outdoors. (4) Outside it was a dark and stormy night.

(4) ○ Correct as is (76) ● 4, 2, 1, 3
(15) ○ 3, 2, 1, 4 (5) ○ 1, 2, 4, 3

Given the difficulty of sequencing tasks, such as that in Example T, the members of the English Language Assessment Advisory Committee concluded that the performance of twelfth-graders was fairly good in this area.

The committee members were not as pleased, however, with the percent correct scores on questions that required students to identify words serving as

transitional elements within and between paragraphs. Example U illustrates typical performance on this kind of task.

Example U

The seven sentences below are in a scrambled order. Some of them can be put together to make a single, unified paragraph. Before attempting to answer any questions, read all of the sentences carefully.

A 1 It probably received its name from its
2 copper-colored head which is triangular
3 in shape.
B 4 Like the rattlesnake, it is a member of
5 the pit viper family having a hollow or
6 pit between the eye and the nostril.
C 7 The copperhead was once the most common
8 and widely distributed of all venomous
9 snakes in the United States.
D 10 This may be the reason that Democrats in
11 the North who sympathized with the South
12 in the Civil War were called "copperheads,"
13 for they were suspected of treachery.
E 14 Unlike the rattlesnake, it has no rattles
15 and strikes without warning.
F 16 Augustus Thomas wrote a full-length drama
17 that he called *The Copperhead.*
G 18 Today, however, it is most frequently
19 found in sparsely settled areas of the
20 South.

Which of the following words serves as a transitional word in the paragraph?

(15) ○ which (line 2)
(13) ○ rattlesnake (line 4)
(18) ○ copperhead (line 7)
(54) ● however (line 18)

As the item data reveal, almost half of the twelfth-graders either did not know the meaning of the term "transitional" or could not apply the concept when asked to identify transitional words in a paragraph. On the basis of twelfth-grade performance on this item and others like it, the members of the committee concluded that students may need increased instructional emphasis in the use of transitional words in their own writing.

The percent correct scores were even lower on several questions that tested students' awareness of inconsistent verb tense from sentence to sentence. Example V illustrates this weakness.

Example V

(1) Winters are more severe in the high mountains than they are at lower elevations. (2) The first frost comes earlier in the fall. (3) Often, a blanket of snow covered the high peaks. (4) As soon as the danger of frost is over, crops such as corn and tobacco may be planted on the mountain slopes that are suitable for farming.

Which sentence does not agree with the time pattern of the rest of the paragraph?

○1	○2	●3	○4
(7)	(22)	(28)	(43)

The members of the English Language Assessment Advisory Committee concluded that the weak performance of students on this kind of task reveals a lack of analytical understanding of structure as it relates to time patterns in paragraph development.

Punctuation and Capitalization. Twenty-eight questions assessed the students' awareness of errors in punctuation and capitalization. This was the second most difficult skill area for twelfth-graders, as the average percent correct score of 54.3 reflects. The percent correct scores on individual items varied considerably, however. For instance, a majority of the students marked the correct response in Example W.

Example W

In the following sentences which punctuation is needed?

We visited Taliesen West Frank Lloyd Wright's famous home in the desert.

(76) ● West, Frank
(15) ○ visited, Taliesen
(2) ○ famous, home
(7) ○ home, in

The members of the English Language Assessment Advisory Committee observed that where punctuation coincided with the natural junctures of spoken English (as in Example W), many students performed successfully. However, where students had to use knowledge of a convention as a guide rather than the sound of oral language, the percent correct scores dropped, as is illustrated by the apostrophe item in Example X.

Example X

A	1	More people know Lewis Carroll than
	2	Charles Lutwidge Dodgson, although
	3	both of these names belonged to the
	4	same man.
B	5	He graduated from Oxford in 1854 and
	6	began teaching mathematics there the
	7	next year.
C	8	During the twenty-five years he served
	9	as a lecturer in mathematics at Oxford,
	10	he wrote such books as *A Syllabus of*
	11	*Plane Algebraical Geometry* and *Sym-*
	12	*bolic Logic.*
D	13	But, it was as an author of children's
	14	books that he won his fame.
E	15	His books, *Alice in Wonderland* and
	16	*Through The Looking Glass,* are known
	17	the world over; and have been trans-
	18	lated into many languages.
F	19	These books also contained many
	20	humorous poems such as *Jabberwocky*,
	21	a poem containing words that had
	22	never been used before.
G	23	Children were loved by him, and he
	24	knew and understood their world of
	25	imagination.

Which is the correct way to write the last word of line 13?

(46) ● children's (28) ○ childrens
(1) ○ childs (25) ○ childrens'

VI. Mathematics Achievement for Grades Six and Twelve

Synopsis of Findings

Compared to the 1975-76 results, the overall achievement scores in mathematics during 1976-77 in California public schools improved slightly in grade six and declined slightly in grade twelve. The results from the norming studies showed that the score of the sixth-grade median student improved in 1976-77 by one percentile point and now ranks at the 51st percentile--one point above the national average. The score of the twelfth-grade median student declined by one percentile point down to the 43rd percentile--seven points below the national average.

Since 1974-75 the Mathematics Assessment Advisory Committee has been asked to review the statewide results and to make suggestions for improving the quality of mathematics programs in California. Although the discussions in this chapter on mathematics achievement reflect the judgments of the Mathematics Assessment Advisory Committee, the Department of Education assumes the responsibility for the contents of this report.

The 1976-77 results on the Survey of Basic Skills: Grade 6 revealed some significant patterns when they were compared to those of 1975-76. The committee noted an improvement of scores in those areas that are generally considered most important; for example, in computation and application-related skills involving whole numbers. Also, the scores in the area of computation with decimals and decimal applications and the scores in measurement skills continued to improve. The improvement in decimals seems to reflect the increased emphasis on the topics recommended in Mathematics Framework for California Public Schools: Kindergarten through Grade Twelve (Sacramento: California State Department of Education, 1975) and the use of the new instructional materials that were selected on the basis of the criteria in that framework. Achievement in computation and application-related skills with fractions declined slightly in 1976-77, reflecting the decreased emphasis in this area as recommended in Mathematics Framework for California Public Schools. The scores of sixth-graders in the area of probability and statistics improved slightly, but they were still judged to be too low.

The analysis of the results on the Survey of Basic Skills: Grade 12 indicated that twelfth-graders continued to perform at the same level as in 1975-76 in the area of whole numbers, fractions, and decimals. Indeed, the committee felt that further improvement in these areas would be difficult to attain since the general math skills of a large number of high school students are not reinforced in their high school years. However, the 1976-77 scores did show significant improvement on those questions that reflected realistic, life-like situations. Achievement in basic skills related to algebra, geometry, measurement, and probability and statistics decreased slightly.

The Mathematics Assessment Advisory committee recommended the following for improving mathematics achievement:

1. Increased instructional emphasis at all grade levels on basic geometric relationships as they apply to practical situations; particular emphasis on the development and use of spatial relationships

2. Continued emphasis in grades three through eight on decimal notation and decimal computation skills

3. Increased emphasis at all grade levels on instruction in the use and understanding of basic probability and statistical terminology

4. Continued strong emphasis at all grade levels on the fundamental skills and concepts of measurement

5. Increased emphasis at all grade levels on the skills needed to read and comprehend technical materials related to mathematics

Mathematics Results for Grade Six

Scope of the Grade Six Survey

The Survey of Basic Skills: Grade 6 was developed specifically to assess mathematics skills taught through the sixth-grade level in most California schools. The 160 questions on the Survey were designed to assess students' skills in the areas of arithmetic, geometry, measurement, and probability and statistics. Figure 5 illustrates the emphasis placed on each skill area in the total test. In the figure the skill area of arithmetic is subdivided into number concepts, whole numbers, fractions, and decimals. The emphasis on each area in the test is consistent with the general mathematics curriculum of most California schools and the recommendations in Mathematics Framework for California Public Schools. A detailed description of the skills assessed in the Survey is given in Test Content Specifications for the Survey of Basic Skills: Mathematics, Grades Six and Twelve (Sacramento: California State Department of Education, 1975). Additional descriptions of the major skills assessed in the Survey and example test questions are included in Appendix F of this report.

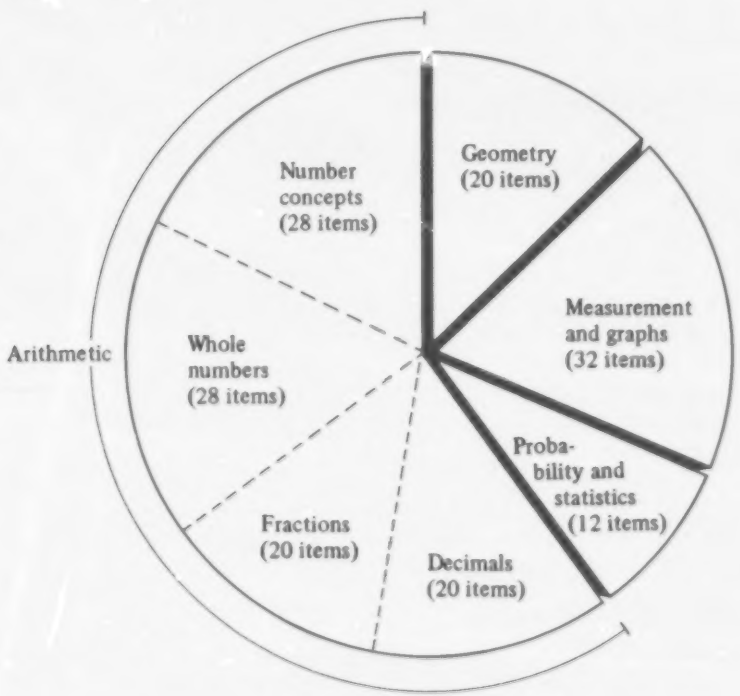


Fig. 5. Skill area emphases in the *Survey of Basic Skills: Grade 6*

Mathematics Results for Grade Six

Table 8 shows the mathematics achievement results of California sixth-grade students on the total test and in the skill areas for 1975-76 and 1976-77. The table also shows the changes in scores from 1975-76 to 1976-77. A detailed breakdown of skill area results is given in Appendix F.

Table 8

Mathematics Performance of California Sixth-Grade Pupils on the Survey of Basic Skills: Grade 6

Skill area	Number of questions	Average percent correct		Gain(+) or loss(-) in Score
		1975-76	1976-77	-4 -2 0 +2 +4
TOTAL MATH	(160)	57.4	57.7	+ .3
Arithmetic	(96)	61.0	61.0	0.0
Number concepts	28	65.4	65.5	+ .1
Whole numbers	28	66.9	67.5	+ .6
Fractions	20	49.6	49.0	- .6
Decimals	20	56.3	57.8	+1.5
Geometry	20	58.8	58.5	- .3
Measurement and graphs	32	52.1	53.5	+1.4
Probability and statistics	12	40.4	40.9	+ .5

In Table 8 the scores and changes in scores are expressed as "average percent correct" scores; that is, the average number of questions answered correctly by sixth-grade students as a group. The average percent correct score can also be thought of as the percent of students answering a "typical" test question correctly. Thus, an increase of 1 percent from 1975-76 to 1976-77 means that 1 percent more students were able to answer a typical test question correctly in 1976-77 than were able to do so in 1975-76.

As shown in Table 8, the overall average percent correct score increased .3 percent correct from 1975-76 to 1976-77. An analysis of this .3 percent correct increase on a skill area-by-skill area basis indicated a gain in all skill areas except fractions and geometry. The greatest gains were made in the areas of decimals (1.5 percent correct) and measurement and graphs (1.4 percent). The greatest decline (.6 percent correct) was in the area of fractions.

Skill Area Results for Grade Six

In the following paragraphs student performance is described for a variety of questions in each skill area. The performance of students is indicated in terms of the percent correct score. For each example question presented, the percent of the students who chose each response is indicated in parentheses before each answer, and the answer space corresponding to the correct response has been shaded. A judgment as to whether the performance on a question was poor, satisfactory, or good must be based upon the difficulty of the task involved. For example, a score of 80 percent correct on one question may not be superior to a score of 50 percent correct on another question unless the difficulty of the tasks involved in the two questions is judged equal. Although the following paragraphs contain the conclusions of the Mathematics Assessment Advisory Committee, the reader should be able to draw his or her own conclusions regarding the students' performance.

Arithmetic

The arithmetic portion of the Survey contained a total of 96 questions in four skill areas: number concepts, whole numbers, fractions, and decimals. As shown in Table 8, the average percent correct score on the total arithmetic portion was 61.0, which was the same score as in 1975-76. The performance of students in each of the arithmetic skill areas is discussed below.

Number Concepts The average percent correct score on the 28 number concept questions was 65.5, which was slightly (.1 percent correct) higher than in 1975-76. The number concept questions can be further classified into the areas of numeration, number theory, and number properties. After reviewing the performance of students on number concept questions, the Mathematics Assessment Advisory Committee judged that students generally performed satisfactorily on such questions.

The 13 numeration questions involved recall of names of whole numbers, fractions, or decimals; identification of place value; and such skills as recognizing points on a number line. On a typical numeration question, 75.6 percent of the sixth-grade students selected the correct answer. This was an increase of .6 percent over 1975-76. Example A is a typical numeration question.

Example A

What digit is in the tens' place in 4,263?

(9) ○ 2
(6) ○ 3
(5) ○ 4
(76) ● 6
(4) ○ None of these

Seventy-six percent of the sixth-grade students marked the question in Example A correctly. It is interesting to note that of those who missed the question, 9 percent applied the place-value rule from the left to the right rather than from the right to the left.

The nine questions on number theory required the students to recognize odd, even, prime, and composite numbers. Several of these questions required them to compute the lowest common multiple or the greatest common divisor. On a typical number theory question, 56.1 percent of the students selected the correct response. The performance of students on these questions remained unchanged from 1975-76 to 1976-77. An example performance on a number theory question (Example B) follows:

Example B

What is the least common multiple of 15 and 18?

(72) ○ 3
(6) ○ 15
(4) ○ 18
(18) ● 90

Nearly 3 percent fewer students responded correctly on the above question in 1976-77 than in 1975-76. It is also informative to note that 72 percent identified the incorrect choice that corresponded to the "greatest common divisor" instead of the "least common multiple." Students generally confuse these concepts.

The six number property questions assessed the students' understanding of either the commutative, associative, or distributive properties. On a typical number property question, 57.8 percent of the students responded correctly. This percent represented a slight decrease (.8 percent) in performance as compared to that in 1975-76. The following question (Example C) is a typical number property question.

Example C

Select the correct name for the missing number.

$6 \times 15 = \square \times 6$

(3) ○ 9
(59) ● 15
(25) ○ 90
(6) ○ 540
(7) ○ None of these

For the above question the 25 percent response for the distractor that corresponded the product of 6 and 15 indicated that a large number of students perhaps did not understand the concept of "commutative property."

Whole Numbers. The average percent correct score on the 28 questions on whole numbers was 67.5, which was an increase of .6 percent correct over 1975-76. The Mathematics Assessment Advisory Committee members examined separately the scores on whole number questions that were purely computational and for those that involved word problems. In the opinion of the committee, students did "quite well" in computational tasks involving addition, subtraction, and multiplication.

The 16 computation questions on whole numbers required students to perform addition, subtraction, multiplication, or division of whole numbers; and the 12 application questions required them to apply arithmetic operations in solving word problems. A typical computation question was marked correctly by 77.9 percent of the students, which reflected a slight increase (.5 percent) over the percent in 1975-76. A typical application question was marked correctly by 53.6 percent of the students, an increase of .7 percent over the 1975-76 percent. Two examples in computation (Examples D and E) and one in application (Example F) follow.

Example D

$268 + 748 =$

(1)	○	996
(2)	○	1,006
(95)	●	1,016
(2)	○	1,116

The above question was marked correctly by almost all sixth-grade students. Although the students experienced difficulty with long-division problems, the statewide scores on such problems did improve slightly in 1976-77. The following is an example long-division problem:

Example E

$27\overline{)8154}$

(6)	○	3,020
(6)	○	2,102
(53)	●	302
(19)	○	32
(16)	○	None of these

As the members of the committee anticipated, a sizable percent of students (19 percent) marked the fourth choice, which indicated a typical long division error involving a zero in the quotient.

The following is an example word problem:

Example F

John has 382 stamps in his stamp collection, Greg has 224, Pete has 310 and Bob has 175. The number of stamps the boys have altogether is CLOSEST to which of the following numbers?

(8) ○ 900
(19) ○ 1,000
(61) ● 1,100
(12) ○ 1,200

The above question involves adding the three numbers and then rounding off the sum to the nearest one hundred.

Fractions. The average percent correct score on the 20 questions on fractions was 49.0 which was .6 percent correct lower than the score in 1975-76. The Mathematics Assessment Advisory Committee members noted that the lower score in this area may be related to the recommendation in Mathematics Framework for California Public Schools for decreased emphasis on fractions in kindergarten through grade six.

Thirteen of the fraction questions involved pure computation; that is, addition, subtraction, multiplication, and division of numbers in fraction form. Seven questions were application problems, which required the students to solve word problems involving common fractions, ratio, and percent. A typical computation question was marked correctly by 49.8 percent of the sixth-grade students, and a typical application question was marked by 47.5 percent. For both types of problems, scores declined .6 percent. Two examples in computation (Examples G and H) and one in application (Example I) are shown below.

Example G

$\frac{1}{2} \times \frac{3}{4} =$

(3) ○ $\frac{1}{8}$
(78) ● $\frac{3}{8}$
(14) ○ $\frac{4}{8}$
(5) ○ $\frac{3}{2}$

Nearly two-thirds of California sixth-grade students were able to apply the multiplication rule for two common fractions.

Example H

$\frac{1}{2} \div \frac{1}{6} =$

(21) ○ $\frac{1}{12}$

(45) ○ $\frac{1}{3}$

(30) ● 3

(4) ○ 12

The problem in Example H requires performing the relatively difficult operation of dividing a proper fraction by another proper fraction.

Example I

Laurie has saved $5 to buy clothes that cost $15. What fraction of the total has she saved?

(18) ○ $\frac{1}{15}$

(11) ○ $\frac{1}{10}$

(22) ○ $\frac{1}{5}$

(49) ● $\frac{1}{3}$

The word problem in Example I was marked correctly by 49 percent of the students. The data indicate that nearly half of the students did not understand the meaning of "fraction of the total."

Decimals. The average percent correct score on the 20 decimal questions was 57.8, which was significantly higher (1.5 percent correct) than the score in 1975-76. The Mathematics Assessment Advisory Committee believed that the gains on decimal questions may be the result of the new emphasis on metrics in mathematics programs throughout the state. Mathematics Framework for California Public Schools contains a recommendation that increased instructional emphasis be placed on the total concept of decimal numbers in kindergarten through grade six.

Of the 20 decimal questions, 12 required the students to perform addition, subtraction, multiplication, and division of numbers in decimal form. The remaining

eight questions were application problems that required the students to solve word problems involving decimal fractions.

A typical computation question was marked correctly by 58.9 percent of the students; this was an increase of 2.3 percent over the 1975-76 score. A typical application question was marked correctly by 56.2 percent of the students, which represented a slight (.4 percent) increase over the 1975-76 score. Two examples in decimal computation (Examples J and K) and one word problem (Example L) are given below.

Example J

38.06
+ 5.68

(2) ○ 33.64 ● 43.74 (91)
(4) ○ 43.64 ○ 44.74 (3)

The above question is a simple problem involving an equal number of digits after the decimal.

Example K

.006 × .08 =

(46) ● .00048
(26) ○ .0048
(11) ○ .048
(7) ○ .48
(10) ○ None of these

The above problem on multiplication of two decimal numbers involves a relatively difficult operation. A significantly greater percent (4 percent) of the students marked the correct answer in 1976-77 than in 1975-76.

Example L

At the Christmas season, the Boy Scouts cut 83 Christmas trees and sold them for $3.50 each. How much did the Scouts receive for the trees?

(5) ○ $260.50
(8) ○ $289.50
(61) ● $290.50
(26) ○ None of these

The above problem requires the student to understand the reading material, formulate a mathematical expression, and then multiply the whole and decimal numbers. Sixty-one percent of the sixth-grade pupils marked the correct answer.

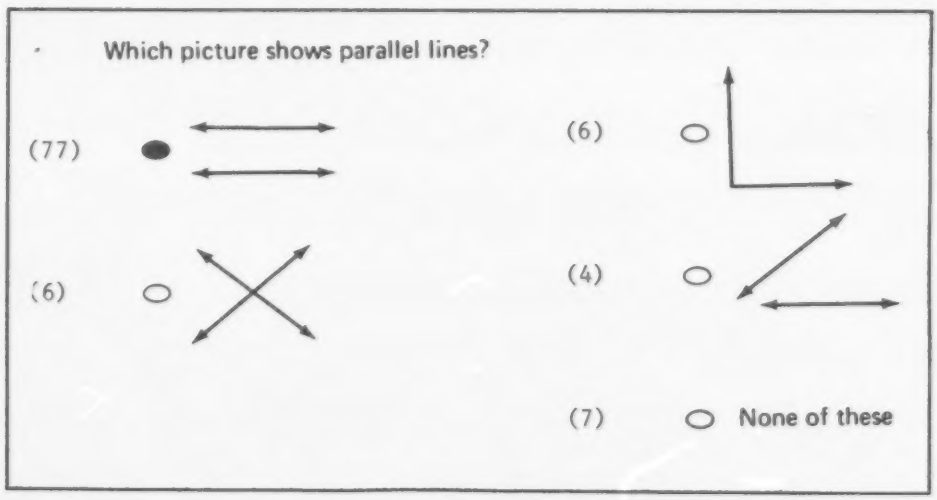
Geometry

The Survey included 20 questions on geometry; eight of the questions required the students to identify basic geometric sets and figures, and the other 12 questions required them to demonstrate an understanding of geometric concepts. As shown in Table 8, the overall average percent correct score in geometry was 58.5, which was slightly (.3 percent correct) lower than the score in 1975-76. A breakdown of the overall percent correct score revealed that a typical recall question was marked correctly by 68.4 percent of the students and that a typical understanding-of-concept question was marked correctly by 51.9 percent of the students. An item-by-item examination of the results by the members of the Mathematics Assessment Advisory Committee revealed that sixth-grade students performed "exceptionally well" on problems involving similar triangles, identification of radii, and units used to measure an angle. The committee also noted that scores were "high" on problems in recognition of geometric shapes. The committee recommended additional instructional emphasis in the following skills or concepts in grades one through six:

- Identification of quadrilaterals, diameter of a circle, and corner of a square as a right angle
- The sum of the interior angles of a triangle is 180°
- Two noncoincident straight lines intersect in a point

One example on recall (Example M) and one on concepts (Example N) are provided below.

Example M



Example N

If two different lines intersect, their intersection is:

(46)	○ a line segment
(10)	○ a line
(35)	● a point
(6)	○ a triangle
(3)	○ a square

The problem in Example N involves a relatively difficult geometric concept. Because of the small percent of correct responses, the committee recommended increased instructional emphasis on the skills involved in such problems.

Measurement and Graphs

The Survey included 32 questions in the area of measurement and graphs. Fourteen questions were recall or computation questions that required students to demonstrate their ability to estimate; convert one unit to another unit; and perform arithmetic operations related to length, mass, volume, and time. The remaining 18 questions were word problems dealing with the measurement of length, area, mass, volume, and time. Some of the questions required the students to interpret graphs.

As shown in Table 8, the average percent correct score in measurement and graphs was 53.5, a marked increase of 1.4 percent correct over the score in 1975-76. A typical recall question was answered correctly by 47.2 percent of the students, which was 2.4 percent higher than in 1975-76. A typical word problem question was answered correctly by 58.4 percent of the students, which represented a slight (.6 percent) increase over the percent in 1975-76.

The Mathematics Assessment Advisory Committee noted that 1976-77 was the second consecutive year in which the students made gains in the area of measurement; over a two-year period, the sixth-grade students registered a gain of 5 percent correct in the knowledge of measurement facts. The committee believed that there is an increasing awareness of metric notation and terminology in kindergarten through grade six as recommended in Mathematics Framework for California Public Schools. An item-by-item analysis of the results by the committee indicated that the sixth-grade students could satisfactorily read different kinds of measurement scales. The committee also determined that the students were weak in working with denominate numbers. Furthermore, two areas in which the committee noted some, but insufficient, improvement were:

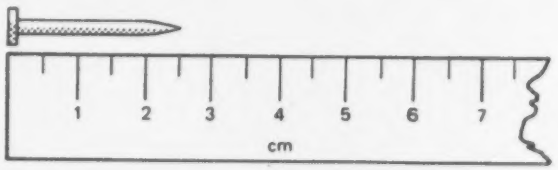
- Conversion of area measures from one unit to another unit within the same system
- Computation of areas and perimeters of simple geometric figures

The committee recommended that increased instructional emphasis be placed on these two skill areas.

Examples O, P, Q, and R are typical questions on measurement and graphs.

Example O

How long is the nail?



(10) ○ 2 cm
(85) ● 2.5 cm
(1) ○ 4.5 cm
(4) ○ 5 cm

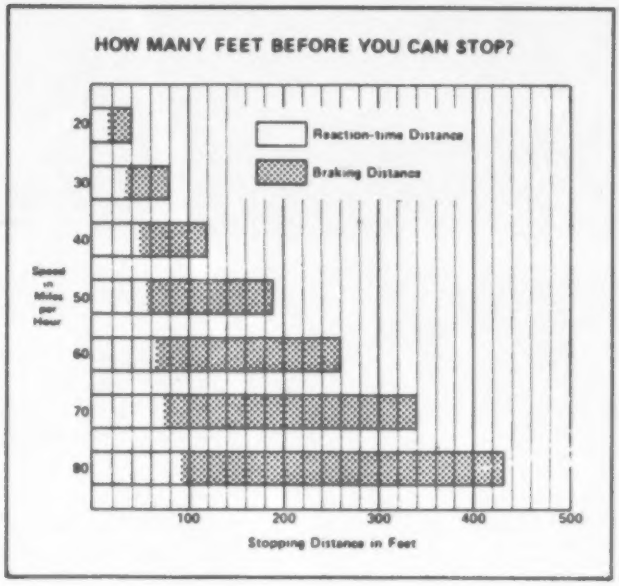
The above question required the students to read the ruler to the nearest one-half centimetre. Ten percent of the students were not able to infer the middle point between the second and third centimetre marks and 4 percent ignored the centimetre marks on the ruler.

Example P

4 hours 30 minutes
×3

(48) ○ 12 hours 30 minutes
(42) ● 13 hours 30 minutes
(6) ○ 7 hours 30 minutes
(4) ○ 7 hours 33 minutes

The question in Example P called for students to multiply a denominate number. The committee noted that 4 percent fewer students answered this question correctly in 1976-77 than in 1975-76.



Example Q

What is the top safe speed indicated for stopping within a maximum distance of 120 feet?

(18) ○ 30 miles per hour ○ 50 miles per hour (23)
(53) ● 40 miles per hour ○ 120 miles per hour (6)

Example R

If Mr. Smith is traveling at 60 miles per hour when he sees a car backing from a driveway into his lane, in how many feet can Mr. Smith stop his car?

(28) ○ 35 ○ 230 (21)
(20) ○ 65 ● 260 (31)

As shown by Examples Q and R, the performance of the sixth-grade students on application of measurement and reading of graph questions varied with the difficulty of the questions.

Probability and Statistics

The sixth-grade Survey included 12 questions on probability and statistics. Six of the questions were related to simple statistical computation or were based on an intuitive approach to probability. The other six questions required the students to use concepts in probability and statistics to solve word problems.

As shown in Table 8, the overall average percent correct score in probability and statistics was 40.9, which was slightly (.5 percent correct) higher than the score in 1975-76. A typical computation question was marked correctly by 42.3 percent of the students, and a typical application-type question was marked correctly by 39.6 percent of the students.

The Mathematics Assessment Advisory Committee noted that students were still weak in the area of probability and statistical terminology. The committee members remarked, as they did in 1975-76, that since probability and statistics concepts and terms are used so frequently in everyday life (e.g., "chances of rain," "batting averages," and "median salary"), students should be able to understand them. In particular, the committee recommended the following:

- Probability and statistical terminology should be introduced and emphasized in the curriculum before the sixth-grade level.
- In the selection and evaluation of new instructional materials in mathematics, attention should be given to the presence of probability and statistical terms and concepts.

Two examples (Examples S and T) of problems in probability and statistics are presented below:

Example S

Find the average of the following set of numbers:

25, 45, 20, 30

(13)	○ 25
(40)	● 30
(22)	○ 35
(13)	○ 40
(12)	○ 45

The question in Example S and a similar question in which the word "average" was replaced by the word "mean" were included in the test to find out how much statistical terminology students learn by the end of the sixth grade. Forty percent of the students marked the correct answer for the question in Example S, but only 20 percent marked the correct answer for the question in which the word "mean" was replaced by "average." Thus, 20 percent of the students may have answered the first question correctly not because they understood "average" as a statistical concept, but because of their day-to-day familiarity with the word "average." It is noteworthy that 65 percent of the sixth-grade students knew the meaning of the word "average" (see page 31) indicating, perhaps, that 25 percent of the students did not know how to compute the average of four numbers.

Example T

There are 4 apples in a basket. One of the apples is green and the rest are red. If one of the apples falls out, the probability that it is a green apple is:

(17) ○ 1

(23) ○ $\frac{1}{3}$

(46) ● $\frac{1}{4}$

(14) ○ $\frac{3}{4}$

The question in Example T is based upon an intuitive approach to probability.

Mathematics Results for Grade Twelve

Scope of the Grade Twelve Survey

The Survey of Basic Skills: Grade 12 was developed to assess the degree to which students have acquired "basic" mathematics skills by the end of the twelfth grade. A statewide committee compiled objectives and reviewed questions for inclusion in the test. The 198 questions on the Survey were designed to assess students' skills in the areas of arithmetic, algebra, geometry, measurement and graphs, and probability and statistics. Figure 6 illustrates the emphasis given to each skill area in the total test. In the figure the skill area of arithmetic is subdivided into the areas of number concepts, whole numbers, fractions, and decimals. A complete description of the skills assessed in the Survey is given in Test Content Specifications for the Survey of Basic Skills: Mathematics, Grades Six and Twelve. Additional descriptions of the major skills assessed in the Survey and example test questions are included in Appendix G of this report.

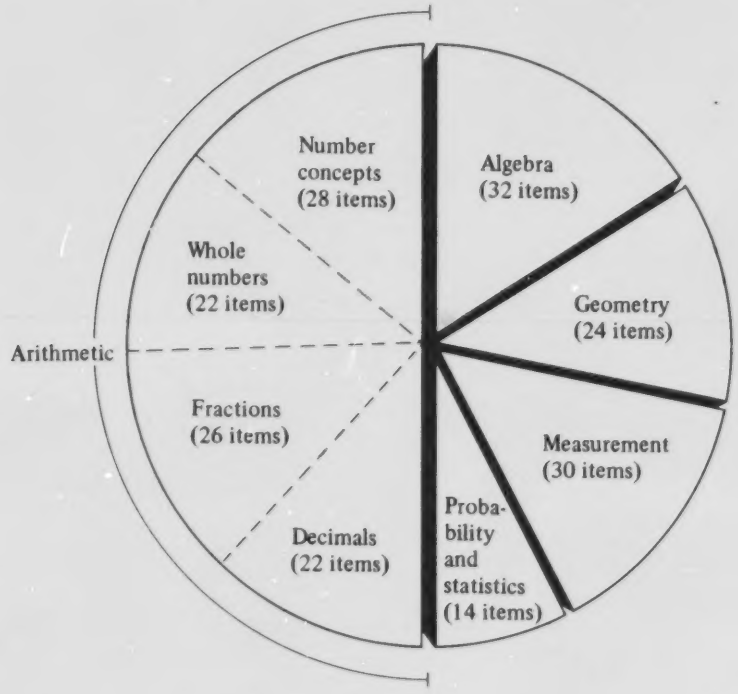


Fig. 6. Skill area emphases in the *Survey of Basic Skills: Grade 12*

Mathematics Results for Grade Twelve

Table 9 shows the achievement results of California twelfth-grade students on the total test and in the skill areas for 1975-76 and 1976-77. The table also shows the increases or decreases in scores from 1975-76 to 1976-77. A detailed breakdown of the skill-area results is given in Appendix G.

In Table 9 the scores and score changes are expressed as the "average percent correct" score, which is the average number of quesitons answered correctly by California students as a group. The percent correct score can also be thought of as the percent of students who answered a "typical" test question correctly. Therefore, an increase of 1 percent from 1975-76 to 1976-77 means that in 1976-77 1 percent more students were able to answer a typical test question correctly than were able to do so in 1975-76.

Table 9

Mathematics Performance of California Twelfth-Grade Students on the Survey of Basic Skills: Grade 12

Skill area	Number of questions	Average percent correct		Gain(+) or loss(-) in score
		1975-76	1976-77	-4 -2 0 +2 +4
TOTAL MATH	(198)	67.0	66.3	- .7
Arithmetic	(98)	72.9	72.1	- .8
Number concepts	28	74.3	73.5	- .8
Whole numbers	22	80.1	80.1	0.0
Fractions	26	66.0	64.5	-1.5
Decimals	22	71.8	71.2	- .6
Algebra	32	62.9	62.1	- .8
Geometry	24	62.7	62.1	- .6
Measurement	30	60.5	59.5	-1.0
Probability and statistics	14	57.2	56.9	- .3

As shown in Table 9, the overall average percent correct score in 1976-77 was 66.3, which was .7 percent correct lower than in 1975-76. A comparison of the skill area scores across years showed that students performed at the same level in whole numbers, but that their performance in all other areas declined. The greatest decline (1.5 percent correct) was in the area of fractions.

Skill Area Results for Grade Six

In the following paragraphs student performance is described for a variety of questions in each skill area. The performance of students is indicated by the percent correct score. For each example question presented, the percent of the students who chose each response is indicated in parentheses before each answer, and the answer space corresponding to the correct response has been shaded. A judgment as to whether the performance on a question was poor, satisfactory, or good must be based upon the difficulty of the task involved. For example, a score of 80 percent correct on one question may not be superior to the score of 50 percent correct on another question unless the difficulty of the tasks involved in the two questions is judged equal. Although the following paragraphs contain the conclusions of Mathematics Assessment Advisory Committee, the reader should be able to draw his or her own conclusions regarding the students' performance.

Arithmetic

The arithmetic portion of the test consisted of 98 questions in four skill areas: number concepts, whole numbers, fractions, and decimals. As shown in Table 9, in 1976-77 the average percent correct score on the total arithmetic portion of the test was 72.1, which was .8 percent correct lower than that in 1975-76. The performance of the students in each of the arithmetic skill areas is discussed below.

Number Concepts. The average percent score on the 28 number concept questions was 73.5, which was .9 percent correct lower than the 1975-76 score. The number concept questions included problems on numeration, number theory, and number properties. In 1976-77 the greatest decline (1.1 percent correct) was on questions involving number properties; the least decline (.3 percent correct) was on questions pertaining to number theory.

The 14 numeration questions involved the recall of names of whole numbers, fractions, and decimals; identification of place value; and such skills as recognizing points on a number line. In 1976-77 a typical numeration question was answered correctly by 70.1 percent of the students. An example numeration question (Example A) is given below.

Example A

Which is the numeral for seven thousand six hundred thirty-four?

(96) ● 7,634	○ 7,643 (2)
(1) ○ 70,634	○ 700,634 (1)

The question in Example A was marked correctly by almost all the students. It is interesting to note that this question also appeared on the sixth-grade test and that 91 percent of the sixth-grade students marked the question correctly.

The eight number theory questions required students to recognize odd, even, prime, and composite numbers. Several questions required computation of the lowest common multiple or the greatest common factor of several numbers. A typical number theory question was answered correctly by 75.9 percent of the students. The question in the following example (Example B) also appeared on the sixth-grade mathematics test.

Example B

If n is an odd number, then $n + 1$ is:

(9) ○ always odd
(76) ● always even
(14) ○ even or odd depending upon what n is
(1) ○ None of these

The question in Example B was marked correctly by 76 percent of the twelfth-grade students. In comparison, only 36 percent of the sixth-grade students answered this question correctly.

The six number properties questions on the twelfth-grade test required students to recognize commutative, associative, and distributive properties. A typical number properties question was marked correctly by 78.5 percent of the students. A number properties question is shown in Example C.

Example C

$\triangle \times 8 = (4 \times 8) + (5 \times 8)$

What number goes in the $\triangle$ above?

○ 2	○ 8	● 9	○ 20
(7)	(6)	(83)	(4)

Although the question in Example C could be answered by several different methods, for example, by solving as an algebraic equation, it was assumed that students would use the distributive property; that is, they would add "4" and "5" to get the answer "9."

Whole Numbers. Of the 98 questions on arithmetic, 22 questions could be classified as whole number questions. Fourteen of the whole number questions were pure computation problems that required the students to perform addition, subtraction, multiplication, or division of the whole numbers. The remaining eight questions were word problems that required the students to apply arithmetic operations. As shown in Table 9, in 1976-77 the overall average percent correct score on whole number problems was 80.1, the same score as in 1975-76. Also, a typical computation question was marked correctly by 87.7 percent of the students, and a typical word problem was marked correctly by 78.5 percent of the students. The computation

and word problem scores remained essentially the same as in 1975-76. Two examples--one in computation (Example D) and one word problem (Example E) follow.

Example D

64)386

(1) ○ 2 remainder 6 ● 6 remainder 2 (92)
(2) ○ 6 remainder 1 ○ 6 remainder 4 (5)

Example E

If a telephone call from Mede to Perse costs 35 cents for the first 3 minutes and 10 cents for each additional minute, then a 6-minute telephone call from Mede to Perse costs how many cents?

(18) ○ (3 × 35) + (3 × 10)
(3) ○ 3 × 35 × 10
(5) ○ (3 × 35) + 10
(74) ● 35 + (3 × 10)

The first problem in Example D--a relatively simple long division question--was marked correctly by 92 percent of the twelfth-grade students. This question also appeared on the sixth-grade test; 78 percent of the sixth-grade students marked the question correctly. The question in Example E required the students to comprehend a word problem and formulate a mathematical expression to use in solving the problem.

Fractions. Of the 98 questions on arithmetic, 26 dealt with fractions. As with whole numbers, 14 of the questions on fractions involved pure computation and 12 were word problems. The word problem questions required students to solve questions involving fractions, ratios, and percents. As shown in Table 9, in 1976-77 the overall average percent correct score in fractions was 64.5, which was 1.5 percent correct lower than the score in 1975-76. The decline (2.1 percent correct) on the computation questions was greater than the decline (.9 percent correct) on the word problems. In 1976-77 a typical computation question was marked correctly by 68.3 percent of the students, and a typical word problem was marked by 60.0 percent. Two examples--one in computation (Example F) and one word problem (Example G) are given below.

Example F

$4 \times \frac{4}{5} =$

○ $1\frac{3}{5}$ ● $3\frac{1}{5}$ ○ $4\frac{4}{5}$ ○ 5
(8) (67) (14) (11)

Example G

A bar of candy was divided among three people so that Mildred had $\frac{1}{3}$ of the bar and Abby had $\frac{1}{2}$. What fraction of the bar was left for George?

● $\frac{1}{6}$	○ $\frac{1}{2}$	○ $\frac{2}{3}$	○ $\frac{5}{6}$
(78)	(3)	(12)	(7)

Both of the above questions also appeared on the sixth-grade Survey. For the problem in Example F, the students were required to multiply a whole number and a common fraction. Sixty-seven percent of the twelfth-grade students marked the question correctly. By comparison, 46 percent of the sixth-grade students marked the question correctly. It is informative to note that 5 percent fewer sixth-graders and 3 percent fewer twelfth graders marked the question correctly in 1976-77 than marked it correctly in 1975-76.

The question in Example G was designed to assess skills in the area of fractions in the context of everyday situations. Seventy-eight percent of the twelfth-graders and 52 percent of the sixth-graders marked the question correctly. In comparison to the results in 1975-76, 1 percent fewer sixth graders and 2 percent fewer twelfth graders marked the question correctly.

Decimals. The arithmetic part of the test contained 22 questions on decimals. Fourteen computational questions required students to perform addition, subtraction, multiplication, and division of numbers in decimal form. The eight word problem questions required the students to solve word problems involving decimals. As shown in Table 9, in 1976-77 the percent correct score on decimal problems was 71.2, which was .6 percent correct lower than the score in 1975-76. The score was much lower on application questions (1.2 percent correct lower) than it was on computation questions (.3 percent correct lower). A typical computation question was marked correctly by 84.0 percent of the students, and a typical application question was marked correctly by 66.8 percent of the students. Two examples (Examples H and I) follow.

Example H

.5 x .5 =

● .25	○ 1.0	○ 2.5	○ 25
(84)	(3)	(12)	(1)

Example I

Miss Jones has $158.62. She makes purchases of $5:25, $49.88, and $10.35 and receives a check for $51.64. How much money does she now have?

(6) ○ $172.46 (10) ○ $41 50
(82) ● $144.78 (2) ○ $13.84

Both of the above questions also appeared on the sixth-grade Survey. The computational question (Example H) which involves multiplication of two decimal fractions, was marked correctly by 84 percent of the twelfth-grade students, which was an increase of 1 percent over the score in 1975-76. By comparison, 76 percent of the sixth-grade students marked the correct answer, an increase of 2 percent over the percent in 1975-76. The question in Example I, which involves working with decimal numbers to solve a word problem, was marked correctly by 82 percent of the twelfth-grade students. Fifty-one percent of the sixth-grade students marked the same question correctly. On this question the scores of both the sixth- and twelfth-grade students showed a slight decline from the 1975-76 scores.

Algebra

Of the 32 questions on algebra, 14 questions required the students to solve linear algebraic equations and recall basic concepts of coordinate geometry. Eighteen questions required the students to solve word problems and to interpret tables, charts, and graphs. As shown in Table 9, the overall average percent correct score in algebra was 62.1, which was slightly lower (.8 percent correct lower) than the score in 1975-76. A typical equation-solving question was marked correctly by 65.9 percent of the students; and a typical question related to tables, charts, or graphs was marked correctly by 59.2 percent of the twelfth-grade students. An item-by-item examination of the results by the committee members revealed that the students read graphs well but experienced difficulty in drawing conclusions from graphs that contained multiple factors. The committee believed that increased instructional emphasis upon these kinds of problems will equip graduating twelfth-graders with life-coping skills. The following three questions (Examples J, K, and L) illustrate the types of skills assessed in algebra.

Example J

If $\frac{4}{x} = \frac{?}{3}$, then the value of x is:

(2) ○ 5 (85) ● 6 (4) ○ 9 (2) ○ 24
(7) ○ None of these

Example K

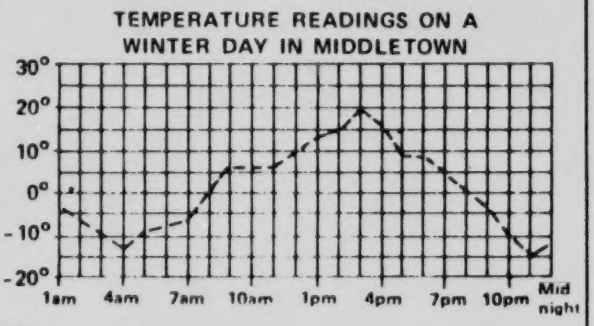
$\frac{1}{x} + \frac{1}{y} =$

(46) ○ $\frac{2}{x+y}$ (29) ○ $\frac{1}{xy}$

(7) ○ $\frac{2}{xy}$ (18) ● $\frac{x+y}{xy}$

Example L

Refer to the graph and answer the related questions.



30 At what hour did the lowest temperature reading occur?

(1) ○ 1 a.m. (60) ● 11 p.m.
(4) ○ 4 a.m. (35) ○ Midnight

Example J involves an equation in one variable. Students generally master skills in solving equations by the end of the eighth grade. Example K is a relatively difficult question. Although manipulation of an algebraic expression in two variables is introduced by the end of the eighth grade, the skill is reinforced for only those students who choose to take a course such as Algebra I in high school. Student performance on Example K should be viewed in light of the fact that only 14 to 18 percent of high school students take Algebra I. The graph problem (Example L) shows how students typically performed on questions of this type.

Measurement

Of the 30 questions on measurement, 12 can be categorized as recall or computation questions that assessed the students' ability to estimate and convert quantities from one unit to another unit. A few questions in this category required students to perform operations involving length, mass, volume, and time. The overall average percent correct score in measurement was 59.5 1 percent correct lower than in 1975-76. A decrease of 1 percent correct was also noted on recall and word problem questions. A typical recall question in measurement was marked correctly by 70.5 percent of the twelfth-grade students, and a typical word problem was marked correctly by 52.2 percent of the students. The committee observed that, in general, student performance in denominate numbers remained at a satisfactory level. The committee found that the students were weak in division of denominate numbers. Students' understanding of the appropriate uses of common units of measure (both metric and U.S. customary units) continued to be satisfactory. The committee recommended increased instructional emphasis in the area of unit pricing and in the use of measuring instruments to find lengths rounded to the nearest indicated unit. The following three questions (examples M, N, and O) illustrate how students performed on measurement questions.

Example M

Which one of the following units would be most appropriate for measuring the area of a basketball court?

(94) ● square feet ○ square inches (2)
(3) ○ square kilometres ○ acres (1)

Esample N

10 decimetres = 1 metre
1000 millimetres = 1 metre

The length of a pencil is 1 decimetre. What is its length in millimetres?

○ 1 (4) ○ 10 (14) ● 100 (69) ○ 1000 (13)

Example O

How many square feet of linoleum are needed to cover a rectangular floor 15 feet long and 12 feet wide?

●180	○90	○54	○27
(78)	(5)	(7)	(10)

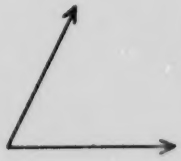
The questions in examples N and O also appeared on the sixth-grade Survey. The question on estimation (Example M) was marked correctly by almost all twelfth-grade students. The question on metric conversion (Example N) was marked correctly by 2 percent fewer twelfth-graders in 1976-77 than in 1975-76. However, 3 percent more sixth-graders marked the question correctly in 1976-77 than did so in 1975-76. Forty-one percent of the sixth-grade students marked the question in Example N correctly.

To solve the problem in Example O, requires the knowledge of the formula for the area of a rectangle. Seventy-eight percent of the twelfth-grade students and 51 percent of the sixth-grade students marked the question correctly. The percent of sixth-grade students who answered this question correctly in 1976-77 dropped 1.1 percent. The percent of twelfth-graders who marked the question correctly in 1976-77 was the same as in 1975-76.

Geometry

Of the 24 questions on geometry, 12 required the students to identify basic geometric sets and figures, and 12 required them to apply basic geometric knowledge and concepts. As shown in Table 9, the overall average percent correct score in geometry was 62.1, a decline of .6 percent correct from the score in 1975-76. The score on application questions declined by 1.4 percent correct, and the score on recall questions increased .3 percent correct. A typical recall question was marked correctly by 75.5 percent of the twelfth-graders, and a typical application question was marked correctly by 48.7 percent of the students. The committee believed that student performance remained satisfactory since these results include the performance of noncollege-bound and college-bound students. In the opinion of the committee, the students scored high on items requiring knowledge of facts and identification of geometric objects and parallelism. The committee also observed that students did not do as well on problems about the similarity of triangles and those involving the Pythagorean theorem. The committee recommended that increased instructional emphasis be given to basic geometric concepts and skills at all grade levels because a weakness in the ability to perceive and use geometric relationships can affect students' problem-solving ability. Many practical problems start with and involve geometric figures as models of real-life situations. The committee also recommended that the study of spatial geometric relationships be strongly emphasized. Examples P, Q, and R illustrate student performance on geometry questions.

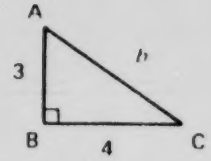
Example P



The geometric figure above is:

(97) ● an angle (2) ○ a triangle
(0.5) ○ a square (0.5) ○ a circle

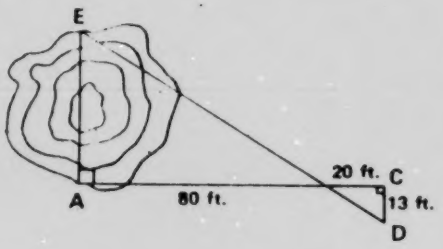
Example Q



Triangle ABC above has a right angle at B. Two of the other sides have lengths of 3 units and 4 units as shown. How long is the hypotenuse *h*?

(6) ○ 3 units (13) ○ 6 units
(8) ○ 4 units (28) ○ 7 units
(45) ● 5 units

Example R



In the figure above, the lines AE and CD are perpendicular to AC. What is the distance from A to E?

(26)	(34)	(17)	(4)
○40 ft.	●52 ft.	○60 ft.	○65 ft.

○None of these
(19)

Example P also appeared on the sixth-grade Survey. Eighty-seven percent of the sixth-grade students marked the question correctly; in comparison, almost all twelfth-grade students marked the question correctly.

Example Q involves application of the Pythagorean theorem, and Example R involves application of the relationships of similar triangles. Forty-five percent of the twelfth-grade students marked the correct answer for Example Q and thirty-four percent marked the correct answer for Example R.

Probability and Statistics

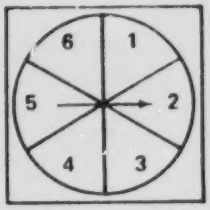
The Survey included 12 questions on probability and statistics. Six of the questions required the students to compute the probability of simple events and such statistics as the mean, mode, and median of a set of given numbers. The eight application-type questions required the students to relate concepts in probability or statistics to solve word problems. As shown in Table 9, the overall average percent correct score in probability and statistics was 56.9, which represented a slight decline (.3 percent correct) from the results in 1975-76. The decline was uniformly reflected in computation questions and application-type problems. A typical computation question was marked correctly by 57.6 percent of the students, and a typical application question was marked correctly by 56.3 percent of the students.

In the opinion of the committee, the students appeared to be familiar with the intuitive approach to probability. Also, there was an improvement of 2 percent in 1976-77 in such skills as finding the "median" of a given set of numbers. However, the committee believed that the percent of students who could find the median and other simple statistical measures was still less than satisfactory.

The committee observed that the terms and concepts in probability and statistics are used commonly, sometimes even daily, and that an understanding of such terms and concepts is essential in today's world.

Examples S and T illustrate student performance in probability and statistics.

Example S



The face of this spinner is divided into 6 equal regions. What is the probability that the pointer will stop on Region 5 if you spin it one time?

(5) ○ 0 (71) ● $\frac{1}{6}$ (8) ○ $\frac{1}{3}$

(11) ○ $\frac{1}{5}$ (5) ○ 1

Example T

Find the median of the following set of numbers: 68, 92, 84, 72, 84, 75, 78

○ 84 ○ 80 ○ 79 ● 78 ○ 75
(23) (19) (32) (10) (16)

Example S involves determining the probability of the occurrence of an event This question also appeared on the sixth-grade test. Fifty-two percent of the sixth-grade students marked the answer correctly as compared to 71 percent in grade twelve. Example T involves ordering numbers and finding the middle number; 10 percent of the twelfth-grade students marked the question correctly.

VII. Analyses of Achievement by Subgroups of Pupils, Schools and Districts

Introduction

In this section of the report the statewide achievement findings are analyzed according to subgroups of pupils, schools and districts. In the pupil level analysis, scores are averaged across all schools for different groups of pupils divided according to sex, English language fluency, mobility level, and socio-economic level. In the school and district analyses, all schools and districts are divided into several groups according to mean Entry Level Test score, percent of pupils who speak a language other than English, percent of pupils from homes receiving Aid to Families with Dependent Children (AFDC), number of students tested, type of district organization, location of school, and level of achievement for the previous year.

Pupil level analyses are available for four factors at grades two and three, two factors at grade six, and only one at grade twelve. School level analyses are presented for test results at all grade levels tested.

Results are presented in sequence according to grade level; information for grades two and three first, then grade six and twelve. Within a grade level, analyses are presented first for the pupil level on all factors, then for the school and district levels.

Some Important Cautions

This chapter presents the relative achievement level and progress since last year for various types of pupils, schools, and districts. The findings must be read with extreme care to avoid drawing conclusions which appear sound on the surface, but can be shown to be misleading when additional information is added to the analysis.

The findings presented in this section are simply descriptive. It is easy to see, for example, how small schools compare to extremely large schools. Looking at the information presented, one might easily conclude that "largeness" is a handicap--since students in small schools typically do better. The real cause (or more likely, causes) for the difference may not be size at all, but other variables which are related to both size and achievement. We know, in this example, that large schools are more likely to be in large cities which, in turn, means that they are much more likely to have a disproportionate number of students from economically and educationally disadvantaged backgrounds. This makes it appear that size is related to achievement in a causal sense, when it is probably only correlated because of its relationship with a more achievement-related variable--socioeconomic level. Not that one ever can be sure of the "real" causes of achievement test differences, but the first step in the process is to sort out those variables which are most directly related to achievement from those which are indirectly or only coincidentally related.

The factors used in this report fall into two broad categories: (1) those variables bearing a direct, strong and well established (but not necessarily causal) relationship to achievement such as achievement level of students when entering school, socioeconomic level and percent of pupils on AFDC; and (2) those variables having either a weak relationship to achievement or a strong, but obviously non-causal, relationship, such as mobility rate, size of school, and type of district organization. One has to be especially careful in noting the trends according to this second group of factors not to treat them as causes when the patterns observed are more likely attributable to the powerful socioeconomic factor represented in the first group. In most cases, the reader's attention will be called to the possibility of alternative explanations.

A second and even more subtle type of trap awaits the reader. In interpreting the changes across years, one assumes consistency of all background factor data; i.e., that all pupil and school attendance patterns are stable. This often is an incorrect assumption to make in California today. For example, the analysis will show that schools in the bottom 10 percent of the state had Reading Test scores of 47.4 in 1975-76, and 47.6 in 1976-77. Unfortunately, it is not known whether the bottom 10 percent of schools in the two years are comparable. Were some schools closed, while others reopened? Were the pupils in some of the bottom 10 percent schools sent to other schools? Without the answers to such questions, precise or sometimes even approximate interpretations of the data are impossible.

The process of determining the direct and indirect relationships of background variables with achievement test data is complex and time consuming; more so than could be completed in time for printing in this report. Nevertheless, with proper alertness to the problems, it is useful to inspect the achievement differences and trends for various types of pupils and schools. This section may raise more questions than it settles. That, too, is progress. In learning how to ask better questions, which in turn can be answered with new data or different analyses of existing data, one gets new insights. This evolutionary process holds promise for determining which types of educational approaches are most effective for different types of pupils. The prescriptions for improving school programs will follow naturally from that information.

A Pupil-Level Analysis of Achievement and Background Factors, Grades Two and Three

As part of the administration of the Reading Test, teachers provide significant background information about each pupil. When used with the test results, these data make it possible to compare the test performance of groups of pupils differing on background characteristics. This section contains an analysis of the effect on pupil performance of four significant background factors: (1) the sex of the pupil; (2) the pupil's English language fluency; (analyzed separately according to second language spoken); (3) the socioeconomic level of the pupil's family (the occupational status of the breadwinner in the pupil's family); and (4) the pupil's mobility rate (the year in which the pupil was first enrolled in the school).

Summary of Findings

The following is a summary of the principal effects of the background factors described above on pupil performance in grades two and three:

1. Girls outscored boys on the Reading Test, and the margin by which the girls lead the boys increased between grade two and grade three.

2. The achievement of both boys and girls improved in 1976-77, and both made greater gains in grade two than they did in grade three.

3. The percent of pupils who spoke only English declined slightly between 1975-76 and 1976-77. The percent of pupils who spoke limited English plus a second language increased slightly.

4. The highest Reading Test scores were made by those pupils who spoke fluent English plus a second language. As a group they scored higher than those who spoke only English. Those pupils who spoke limited English plus a second language scored substantially lower than those in the two groups mentioned above. Of the pupils in the two categories of (1) fluent English and other language and (2) limited English and other language, those whose other language was Spanish scored the lowest.

5. The occupation of the breadwinner in the pupil's family was more closely related to Reading Test scores than any other factor except the pupil's Entry Level Test score. On the average, the pupils from the highest socioeconomic-level families achieved the highest scores on the Reading Test; the pupils from families at the second highest socioeconomic level achieved the second highest scores; and so forth. The same pattern prevailed with regard to percent of pupils who scored below the first quartile; the pupils from families in the highest socioeconomic group were the least

represented in that group, and the pupils from families in the lowest socioeconomic group were the most represented.

6. The achievement gap between the pupils in the highest and lowest socioeconomic groups narrowed slightly between 1975-76 and 1976-77.

7. Pupils were more mobile (had a greater tendency to change schools) in 1976-77 than in 1975-76.

8. The more mobile pupils (i.e., those who enrolled in the school after grade one) scored lower than those who enrolled in kindergarten or grade one and stayed there through grades two and three. Thus, it appears that stability of enrollment is related to higher Reading Test achievement. However, since it is also true that pupils from higher socioeconomic-level families tend to be more stable than those from lower economic strata, the true impact of mobility per se was probably very minor.

9. The relationship of mobility to reading achievement appeared to be lessening. Between 1975-76 and 1976-77 greater gains were made by the more mobile pupils.

Method of Analysis

The figures in this section show the achievement of pupils in grades two and three in 1975-76 and in 1976-77. The achievement scores are further broken down to show the comparative scores of those having different background characteristics. For instance, in Table 10 the achievement scores of pupils in grades two and three in both 1975-76 and 1976-77 are further broken down into the scores of boys and girls.

Pupil achievement is expressed in two ways. The "mean Reading Test score" is the average percent of correct test answers for a group. The "percent scoring below first quartile on the Reading Test" is the percent of pupils within a group who scored in the bottom 25 percent of all pupils. Table 10, for instance, shows that in 1976-77 boys in grade two had a 79.5 mean Reading Test score, which means that they averaged 79.5 percent correct answers on the test. Table 10 also shows that 28.5 percent of grade two boys in 1976-77 scored below the first quartile on the Reading Test, which means that 28.5 percent of boys in grade two were in the bottom one-fourth of all the second-grade pupils who were tested. Both of these achievement-reporting methods are necessary to make the comparisons reported in this section.

Percentage Below First Quartile. The figures showing the percent of each group that scored below the first quartile are included in the annual report for the first time this year. These figures make it possible to compare achievement between grades two and three, which was not possible when only mean percent correct scores were reported.

Any group of pupils can be divided into the fourths that scored highest, second highest, third highest, and lowest. The first quartile is the score that marks the border between the lowest and next-lowest fourths of the pupils

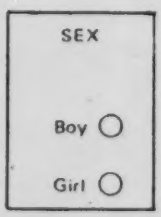
tested. The pupils who score below the first quartile on a test represent the lowest scoring one-fourth of the pupils who took the test. In an absolutely equal distribution of test scores, 25 percent of each group would score below the first quartile. Thus, if more than 25 percent of a particular group scores below the first quartile, that group is represented more heavily than average among the lowest-scoring pupils. The opposite is true if less than 25 percent of the members of a group score below the first quartile.

The following examples show how both the mean score and the percent of pupils scoring below the first quartile are used to make comparisons. The mean scores in the examples are from the "Mean Reading Test Score" column in Table 10.

> Example 1: Since grade-two boys had a mean score of 65.2 in 1975-76 and 66.1 in 1976-77, it can be said that their achievement improved by .9 percent correct between the years. This use of percent correct scores provides a valid comparison.
>
> Example 2: Comparisons across grade levels are accurate only when the number of pupils below the first quartile is used. Percent correct scores cannot be used to answer the question, "Did the gap between boys' and girls' scores lessen between grades two and three?" They would provide the following answer. In 1976-77, the grade-two boys' score was 66.1 and grade-two girls' score was 70.9 (a difference of 4.8 percent). In grade three the scores were 79.9 for boys and 83.5 for girls (a difference of 3.6). Does this mean that the gap between boys and girls narrowed from 4.8 to 3.6 percent correct? No. Such an interpretation would be incorrect because pupils in both grades two and three take the same test. This causes scores of the older grade-three pupils to be more closely grouped at the top of the range than those of the grade-two pupils. With scores distributed differently over the range of percentages, a change of a few percent correct points has a different significance in grade two than in grade three. Using "percent below the first quartile" provides for a better comparison. Thus, 28.2 percent of the grade-two boys and 28.5 percent of the grade-three boys (+0.3 percent) scored below the first quartile. For girls, 21.7 percent in grade two and 21.4 percent in grade three scored below the first quartile (a decrease of the same .3 percent). Therefore, since grade-three boys make up a greater portion of the lowest-scoring quarter than do grade-two boys (and the converse for girls), it may be concluded that boys' and girls' scores are less equal in grade three and that the gap between the two sexes widens somewhat as pupils become older.

Sex of Pupil

Teachers were asked to designate the sex of each pupil on the pupil's test booklet as follows:



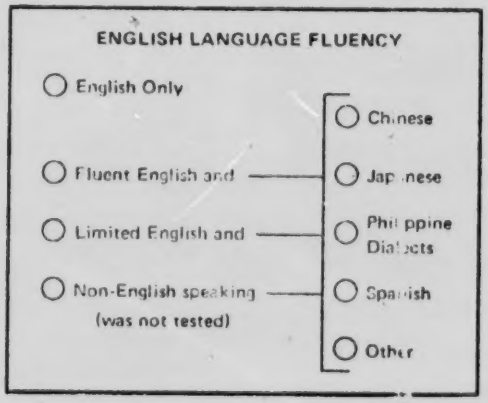
Slightly more boys than girls were tested in 1976-77 in both grades two and three (see Table 10). The numbers tested were more nearly equal in grade three, as they were the previous year. The percentage of nonresponses (no sex indicated by teacher) increased somewhat in 1976-77. This may have been caused by the moving of the response grid for this factor, which the teacher fills in, to a less noticeable position on the test booklet.

Both sexes in both grades showed improvements in mean percent correct. The girls in grade two answered an average of 70.9 percent of the questions correctly, an increase of .9 percent correct over 1975-76. The girls in grade three answered 83.5 percent of the questions correctly, an improvement of .3 percent. The improvement of the boys was about the same; in grade two they averaged 66.1 percent correct, an increase of .9 percent over the previous year. Those in grade three answered 79.9 percent of the questions correctly, an improvement of .4 percent.

More boys than girls scored below the first quartile, and the percentage of boys in this group increased between grades two and three. Of the grade-two girls, 21.7 percent scored below the first quartile; in grade three the figure was 21.4 percent. Boys showed just the opposite result, going from 28.2 percent in grade two to 28.5 percent in grade three. This increased percentage of boys in the first quartile indicates a widening of the gap between boys' and girls' achievement as they moved from grade two to grade three.

English Language Fluency

Teachers were asked to designate the language(s) that the pupil spoke as follows:



Among the grade-three pupils tested, 78.8 percent spoke English only, 13.9 percent spoke fluent English plus a second language, 5.7 percent spoke limited English plus a second language, and 1.1 percent spoke no English (see Table 11). Spanish was the predominant second language as shown in Figure 7. A similar distribution was found among grade-two pupils. From 1975-76 to 1976-77 changes occurred mainly in the number of English-only and limited-English speakers. The numbers of English-only pupils declined .5 percent in grades two and three, and those of limited-English-speaking pupils increased .8 percent in grade two and .7 percent in grade three. The percents of fluent-English-speaking and non-English-speaking pupils remained virtually the same.

The scores of English-only pupils were substantially above the statewide averages (see Table 11). Second-grade pupils who spoke only English answered 72.0 percent of the questions correctly (68.4 percent was the statewide average), and third-grade pupils who spoke only English answered 84.3 percent of the questions correctly (81.7 was the statewide average). The pupils who spoke fluent English plus a second language other than Spanish achieved even higher scores as shown in Figure 8. Particularly high achievement was shown by children who spoke fluent English plus Chinese or Japanese. The average score of second-grade children in those categories exceeded the third-grade statewide average. Pupils who spoke fluent English plus Spanish had scores well below the statewide averages--59.1 percent correct in grade two and 75.0 percent correct in grade three. The average scores of limited-English speakers also were below the statewide averages. Those pupils who also spoke Spanish scored lower than those who spoke other languages.

At both grade levels pupils of all categories of English fluency improved from 1976-75 to 1976-77. The greatest gains were made by the Chinese-speaking pupils, and the smallest gains were registered by the Spanish-speaking pupils.

Occupation of the Breadwinner in the Pupil's Family

Teachers were asked to designate as follows the occupational category of the breadwinner in each pupil's family:

SOCIOECONOMIC STATUS

- ○ Executives, Professionals, and Managers
- ○ Semiprofessionals, Clerical and Sales Workers, and Technicians
- ○ Skilled and Semiskilled Employees
- ○ Unskilled Employees (and Welfare)
- ○ Unknown

The occupational information permitted a comparison of pupils' scores by the socioeconomic status of their parents. The results are shown in Table 12 and Figure 9.

In both grades two and three, more parents were listed as executive/professional and fewer as semiprofessional and skilled/semiskilled than in 1975-76. Thirty-eight percent of the parents of third graders were classified as executive/professional and semiprofessional compared to 36.6 percent of the parents of grade-two pupils. This may reflect the upward occupational progress of parents.

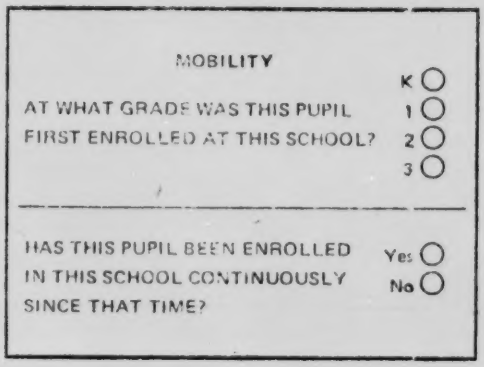
Table 12 shows the considerable achievement difference between children of different socioeconomic backgrounds. Grade-two children of parents in the executive/professional category scored higher than the statewide average for third graders. Grade-three children of parents in the unskilled/welfare category scored below the statewide average for second graders. There was

a difference of more than two years' achievement between pupils of the highest and lowest socioeconomic groups of the same grade level.

Similar differences were noted in the percents of pupils who scored below the first quartile. In grade three, less than 6.2 percent of the pupils whose parents were classified as professionals scored below the first quartile. In contrast, almost half (49.4 percent) of those whose parents were classified in the unskilled/welfare category scored below the first quartile. Thus, a grade-three child from the lowest socioeconomic group was about eight times as likely to score below the first quartile than one from the highest socioeconomic group.

Pupil Mobility

Teachers were asked to designate as follows the grade at which each child first enrolled in the school:



The information permitted a comparison of pupils' scores by the pupils' length of time at their school. The results are shown in Tables 13 and 14 and Figure 10.

Approximately half the pupils tested had not changed schools since their enrollment in kindergarten. As shown in Table 13, the children in this category included 56.1 percent of the grade-two pupils and 47.7 percent of the grade three pupils. However, about one-fourth of the pupils tested had moved to their current school during the year of testing (25.6 percent of the second graders and 24.1 percent of the third graders). The lower figure for grade-three pupils probably reflects a tendency of families to become less mobile as their children grow older.

The mobility rates increased in both grades between 1975-76 and 1976-77 (see Table 13). The percent of second-grade pupils who remained in the same school since kindergarten decreased from 57.1 percent in 1975-76 to 56.1 percent in 1976-77. Third-grade pupils showed a similar decrease in enrollment stability, from 48.4 percent to 47.7 percent in the same two years. Similarly, more pupils in 1976-77 had been in their current school less than one year at the time of testing than in 1975-76. For second-grade pupils. this number increased from 24.7 percent in 1975-76 to 25.6 percent in 1976-77. For third graders, it rose from 23.2 percent in 1975-76 to 24.1 percent in 1976-77.

Pupils with stable enrollments (that is, with longer enrollments at the same school) generally had higher test scores than those with less stable enrollments. Among grade-two pupils those who were enrolled in the same school since kindergarten scored 70.2 percent correct; those enrolled in the same school since grade one scored 67.3 percent correct; and those who were enrolled in the same school since grade two scored 65.5 percent. The patterns were similar for third graders. Grade-three pupils who were in the same school since kindergarten scored 83.6 percent correct; those in the same school since grade one scored 81.3 percent correct; those in the same school since grade two scored 80.6 percent correct; and those in the same school since grade three scored 78.8 percent correct.

Part of the pattern of higher achievement among the pupils with more stable enrollments can be attributed to the fact that children from families of higher socioeconomic level, whose enrollments are generally more stable, also tend to score higher. This can be seen in Table 14, which includes figures for both socioeconomic status (the occupation of the breadwinner in the pupil's family) and mobility. Table 14 and Figure 10 show that mobility is only mildly related to pupil achievement. It is true that the children of the highest mobility group within each socioeconomic cagetory had both the lowest mean test scores and the largest representation among pupils who scored below the first quartile and that achievement usually is directly proportional to the time that a child is enrolled in the school. However, the scores of children in different socioeconomic groups are profoundly different; they do not even overlap. For example, the most mobile children (those who enrolled in grade three at their present school) of parents classified as executive/professional still outscored the most stable pupils (those in the same school since kindergarten) of the next lower socioeconomic group (children of parents in the semiprofessional category). The same holds true for the other socioeconomic groups. Furthermore, the gap between any two socioeconomic groups was greater than the spread of scores within each group. For example, the difference between the most and least mobile pupils in the unskilled/welfare group was 5.7 percent (the difference between 71.4 percent and 65.7 percent). This was still less than the 8.5 percent gap between the least mobile pupils in the unskilled/welfare group (71.4 percent) and the most mobile pupils in the skilled/semiskilled group (79.9 percent). These data show that while mobility does affect pupil scores, its impact is almost trivial in comparison to that of socioeconomic level of the pupil's family.

From 1975-76 to 1976-77 the children of higher mobility made greater achievement gains than did the children of more stable enrollments, as shown in Table 13. This narrowed the gap between the scores of the two groups. In grade two the children who were enrolled in the same school since kindergarten gained .8 percent, while those enrolled in the same school since second grade gained 1.2 percent. In grade three the children who were enrolled in the same school since kindergarten gained .2 percent, while those enrolled in the same school since third grade gained .9 percent.

Table 10

Reading Test Scores by Sex
1975-76 and 1976-77

Sex	Percent of Population		Mean Reading Test Score		Percent Scoring Below First Quartile on the Reading Test	
	Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3
Boys 1975-76	50.3	49.9	65.2	79.5	28.3	28.5
1976-77	50.0	49.8	66.1	79.9	28.2	28.5
Difference (1977-76)	(-0.3)	(-0.1)	(+0.9)	(+0.4)	(-0.1)	(-0-)
Girls 1975-76	49.3	49.6	70.0	83.2	21.6	21.4
1976-77	49.1	49.5	70.9	83.5	21.7	21.4
Difference (1977-76)	(-0.2)	(-0.1)	(+0.9)	(+0.3)	(+0.1)	(-0-)

Table 11

Reading Test Scores by English Language Fluency and Other Language Spoken

English Language Fluency	Other Languages Spoken	Percent of Population				Mean Reading Test Score						Percent Scoring Below the 1st Quartile on the Reading Test					
		Grade 2		Grade 3		Grade 2			Grade 3			Grade 2			Grade 3		
		75-6	76-7	75-6	76-7	75-6	76-7	Difference	75-7	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference
State Total		100.0	100.0	100.0	100.0	67.7	68.4	+ .7	81.4	81.7	+ .3	25.0	25.0	-0-	25.0	25.0	-0-
English Only		79.2	78.7	79.3	78.8	70.9	72.0	+1.1	84.3	84.3	-0-	19.8	19.3	- .5	19.7	19.2	- .5
Fluent English	Chinese	.5	.5	.6	.6	80.5	81.9	+1.4	89.3	91.1	+1.8	8.4	5.9	-2.5	9.9	7.4	-2.5
	Japanese	.4	.4	.4	.4	82.3	82.8	+ .5	91.7	91.8	+ .1	5.5	5.1	_ .4	6.4	6.2	- .2
	Philippine Dialects	.7	.7	.7	.7	74.5	75.6	+1.1	85.6	87.5	+1.9	11.7	11.7	-0-	16.6	13.3	-3.3
	Spanish	9.2	9.2	10.3	10.5	58.1	59.1	+1.0	74.5	75.0	+ .5	36.8	36.8	-0-	38.3	38.6	+ .3
	Other	1.4	1.5	1.6	1.6	73.0	74.2	+1.2	85.5	86.1	+ .6	16.0	15.1	- .9	17.3	16.6	- .7
	No Response	.2	.2	.2	.2	62.8	63.3	+ .5	79.1	78.3	- .8	30.9	33.9	+3.0	30.5	33.1	+2.6
	TOTAL	12.4	12.4	13.8	13.9	62.5	63.5	+1.0	77.5	78.1	+ .6	30.8	30.6	- .2	32.6	32.5	- .1
Limited English	Chinese	.2	.2	.2	.2	56.5	60.2	+3.7	70.7	71.9	+1.2	38.3	35.9	-2.4	45.9	46.2	+ .3
	Japanese	.1	.1	a	.1	65.9	66.1	+ .2	77.2	78.3	+1.1	22.8	23.6	+ .8	34.1	32.1	-2.0
	Philippine Dialects	.2	.2	.2	.2	57.0	60.0	+3.0	70.4	71.6	+1.2	37.8	34.0	-3.8	46.6	45.5	-1.1
	Spanish	5.1	5.8	4.1	4.7	42.1	42.3	+ .2	54.5	53.8	- .7	67.3	68.0	+ .7	74.3	76.6	+2.3
	Other	.5	.6	.5	.6	50.4	53.3	+2.9	59.5	63.6	+4.1	48.9	45.7	-3.2	68.0	60.7	-7.3
	No Response	.1	.1	.1	.1	46.4	42.8	-3.6	57.4	58.3	+ .9	62.1	68.7	+6.6	68.1	69.7	+1.6
	TOTAL	6.2	7.0	5.0	5.7	44.1	44.6	+ .5	56.4	56.2	- .2	63.3	63.6	+ .3	71.3	72.6	+1.3
Non-English Speaking		1.4	1.5	1.1	1.1	29.1[b]	29.1[b]	-0-	29.1[b]	29.1[b]	-0-	100.0[b]	100.0[b]	-0-	100.0[b]	100.0[b]	-0-
Non-Response		.8	.4	.8	.5	68.6	68.9	+ .3	81.1	82.5	+1.4	23.2	22.8	- .4	25.4	23.4	-2.0

[a] Value less than 0.05 percent

[b] The computed chance score for pupils who were unable to take the test.

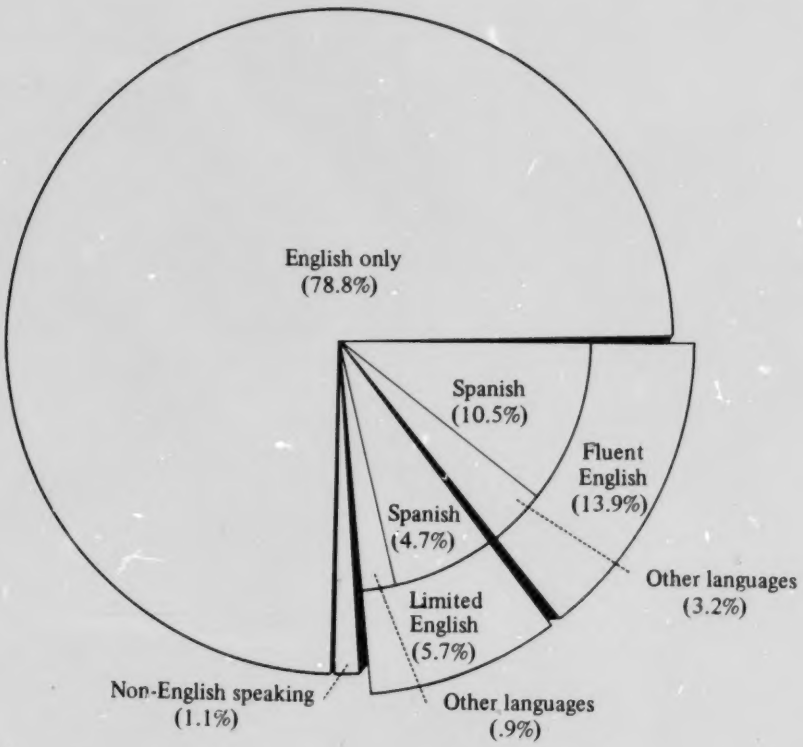


Fig. 7. Distribution of California third grade pupils according to English language fluency and other language spoken, as coded by their teachers

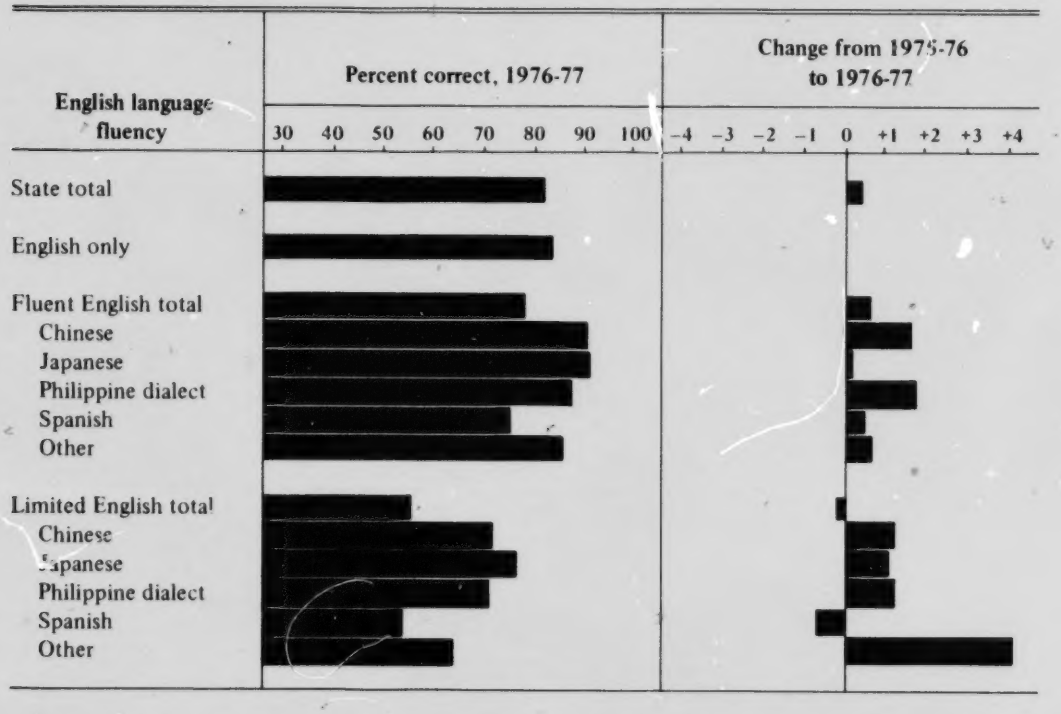


Fig. 8. *Reading Test* scores by English language fluency and other language spoken, grade three

Table 12

Reading Test Scores by Occupation of Principal Breadwinner in Pupil's Family

Occupation of Principal Breadwinner	Percent of Population				Mean Reading Test Score						Percent of Pupils Scoring Below First Quartile					
	Grade 2		Grade 3		Grade 2			Grade 3			Grade 2			Grade 3		
	75-6	76-7	75-6	76-7	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference
State Total	100.0	100.0	100.0	100.0	67.7	68.4	+ .7	81.4	81.7	+ .3	25.0	25.0	-0-	25.0	25.0	-0-
Executive, Professional or Manager	15.3	15.7	15.9	16.5	83.0	83.7	+ .7	91.9	92.1	+ .2	6.1	6.0	- .1	6.1	6.2	+ .1
Semiprofessional, Clerical or Sales Worker, or Technician	21.3	20.9	21.8	21.5	75.8	76.6	+ .8	87.8	88.1	+ .3	12.5	12.4	- .1	12.8	12.6	- .2
Skilled or Semiskilled Employee	36.5	36.3	36.8	36.4	66.0	67.1	+1.1	81.0	81.4	+ .4	25.4	25.2	- .2	25.4	25.5	+ .1
Unskilled Employee (or on Welfare)	19.3	19.1	18.1	18.2	52.9	53.8	+ .9	68.1	68.7	+ .6	47.6	47.6	-0-	49.7	49.4	- .3
Unknown	6.2	6.6	5.9	6.0	56.6	56.8	+ .2	71.5	71.5	-0-	41.9	43.0	+1.1	42.7	43.2	+ .5
No Response	1.3	1.4	1.5	1.4	65.9	65.6	- .3	80.3	79.2	-1.1	27.1	28.8	+1.7	26.7	29.5	+2.8

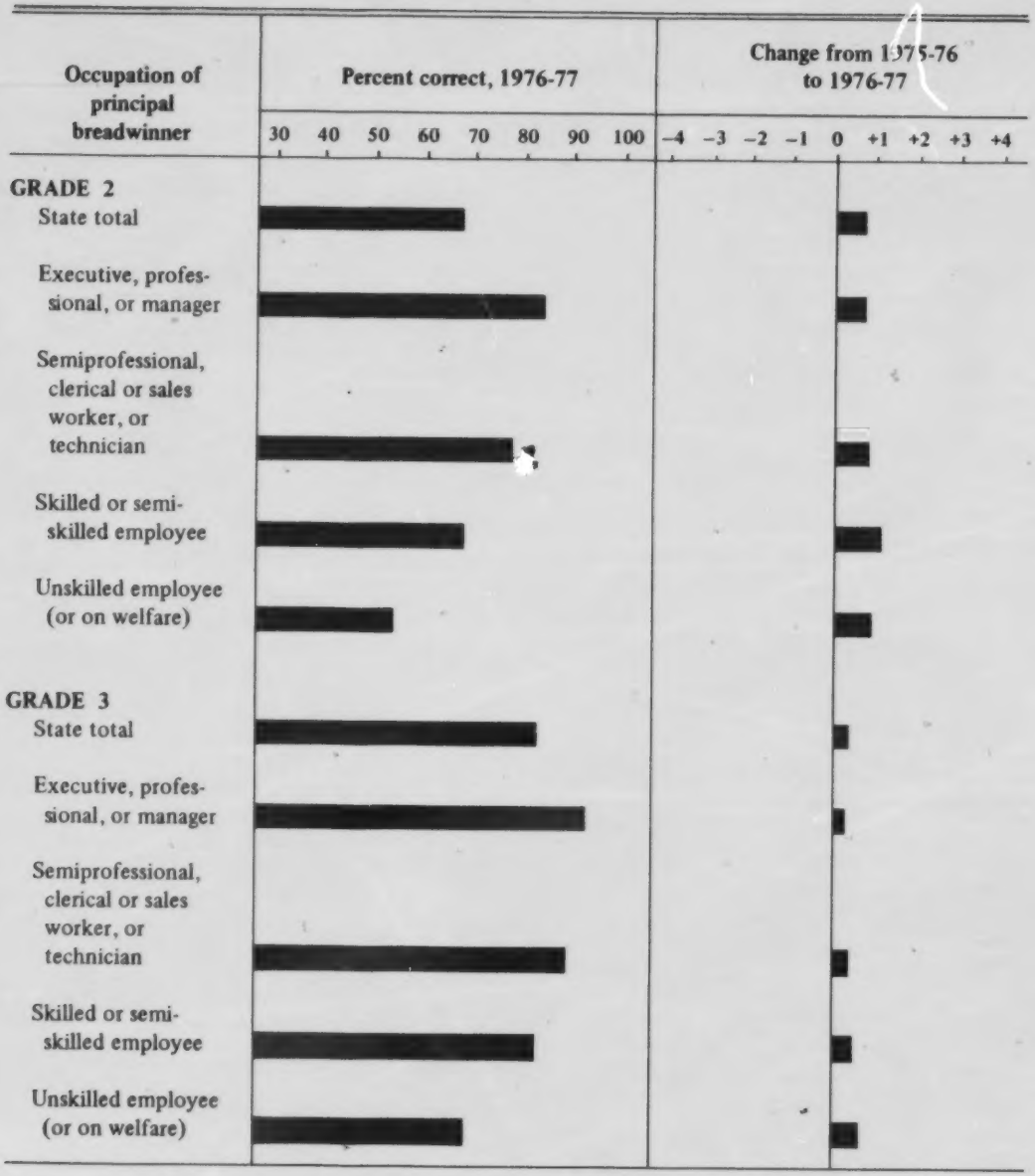

Occupation of principal breadwinner
Percent correct, 1976-77
30 40 50 60 70 80 90 100
Change from 1975-76 to 1976-77
−4 −3 −2 −1 0 +1 +2 +3 +4
GRADE 2
State total
Executive, professional, or manager
Semiprofessional, clerical or sales worker, or technician
Skilled or semi-skilled employee
Unskilled employee (or on welfare)
GRADE 3
State total
Executive, professional, or manager
Semiprofessional, clerical or sales worker, or technician
Skilled or semi-skilled employee
Unskilled employee (or on welfare)

Fig. 9. *Reading Test* scores by occupation of principal breadwinner in pupil's family, grades two and three

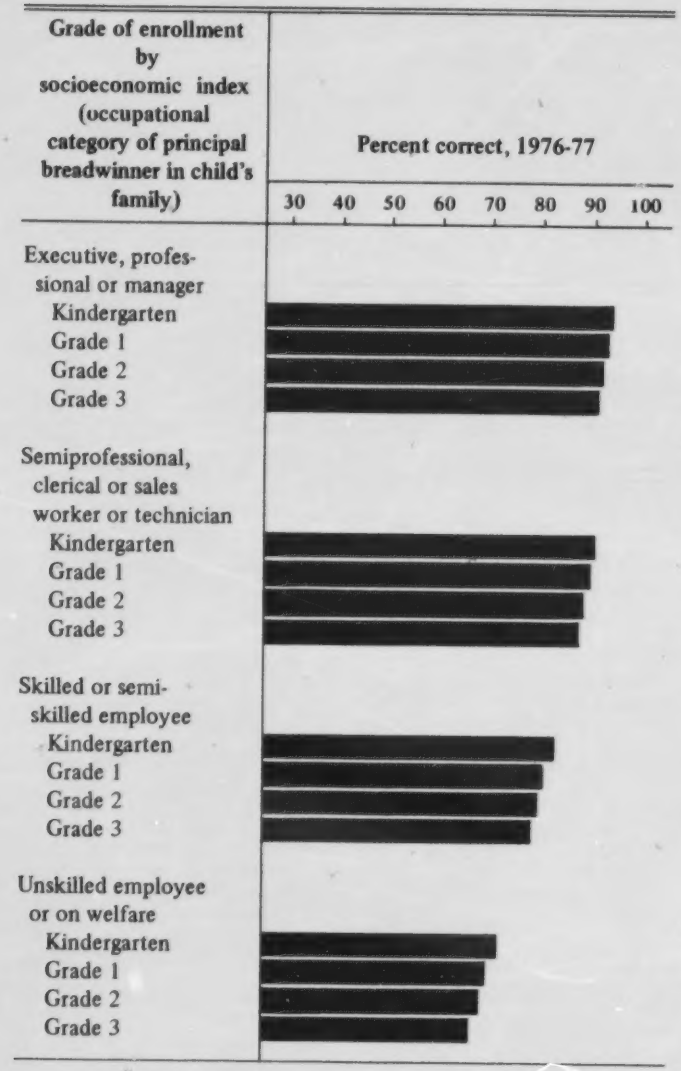


Fig. 10. *Reading Test* scores by socioeconomic index and grade of enrollment, grade three, 1976-77

Table 13

Reading Test Scores by Mobility Rate

Grade in Which Pupil Was Enrolled in School of Testing	Percent of Population				Mean Reading Test Score						Percent of Pupils Scoring Below First Quartile					
	Grade 2		Grade 3		Grade 2			Grade 3			Grade 2			Grade 3		
	75-6	76-7	75-6	76-7	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference
State Total	100.0	100.0	100.0	100.0	67.7	68.4	+ .7	81.4	81.7	+ .3	25.0	25.0	-0-	25.0	25.0	-0-
Kindergarten	57.1	56.1	48.4	47.7	69.4	70.2	+ .8	83.4	83.6	+ .2	22.0	22.3	+ .3	21.5	21.7	+ .2
Grade 1	17.1	17.5	13.1	12.6	66.2	67.3	+1.1	81.3	81.3	-0-	27.1	26.6	- .5	25.0	25.9	+ .9
Grade 2	24.7	25.6	14.3	14.8	64.3	65.5	+1.2	80.2	80.6	+ .4	30.3	29.7	- .6	27.0	27.0	-0-
Grade 3	--	--	23.2	24.1	--	--	-0-	77.9	78.8	+ .9	--	--	-0-	30.8	29.7	-1.1
No Response	1.1	.8	.9	.8	64.4	65.6	+1.2	76.5	78.6	+2.1	28.8	30.1	+1.3	34.0	31.5	-2.5

Table 14

Reading Test Scores by Socioeconomic Status and Mobility Rate
Grade Three
1976-77

Occupational Category of Principal Breadwinner in Child's Family	Grade in Which Pupil Was Enrolled in School of Testing	Percent of Occupational Category	Mean Reading Test Score	Percent of Pupils Scoring Below First Quartile
Executive, Professional or Manager	Kindergarten	53.5	92.6	5.4
	Grade 1	12.9	92.3	5.6
	Grade 2	13.9	91.6	7.0
	Grade 3	19.7	90.9	8.1
Semiprofessional, Clerical or Sales Worker or Technician	Kindergarten	49.5	88.8	11.4
	Grade 1	12.5	88.1	12.6
	Grade 2	14.9	87.7	13.7
	Grade 3	23.1	87.1	14.5
Skilled or Semiskilled Employee	Kindergarten	50.1	82.5	23.5
	Grade 1	12.4	80.7	26.9
	Grade 2	14.5	80.8	26.7
	Grade 3	23.0	79.9	28.0
Unskilled Employee or on Welfare	Kindergarten	41.6	71.4	45.4
	Grade 1	13.4	68.4	50.2
	Grade 2	16.1	67.3	51.7
	Grade 3	28.8	65.7	53.1

A School-Level Analysis of Achievement and Background Factors, Grades Two and Three

This section contains an analysis of Reading Test results for grades two and three. In the analysis, the average achievement levels of entire schools are considered. In this way comparisons can be made of changes that occurred among schools with different background characteristics. This school-level analysis complements the pupil-level analysis, in which test results were considered on the basis of individual pupil characteristics. The reader is reminded of the need for caution in interpreting the findings presented in this section, as pointed out in the beginning of this chapter.

The following is a summary of the findings in the school-level analysis:

Summary of Findings

1. Schools at all achievement levels, that is, those in the lower, middle, and upper ranks, gained over last year. In 1975-76 only the upper half of all schools had higher scores than the year before. All schools except those with the very lowest scores regained the losses suffered in 1975-76. The greatest gains appeared to have been made by those schools around the average for grade two and those in the lower middle range for grade three.

2. Scores on the Entry Level Test, a school-readiness test given to children as they enter grade one, were closely related to the grade two and grade three Reading Test scores. The substantial achievement gap between schools with the highest and lowest average Entry Level Test scores did not appear to be widening.

3. Schools with low average socioeconomic levels did much more poorly on the Reading Test than schools with high average socioeconomic levels. Although the gap between such schools was about the same in grades two and three, it increased for both grades between 1975-76 and 1976-77.

4. The size of a school appeared to have minimal impact on reading achievement level.

5. The schools with the lowest concentrations of bilingual students scored better than did those with the highest concentrations of bilingual students. The schools with the fewest bilingual students made greater achievement gains between 1975-76 and 1976-77 than those with the most bilingual students.

6. The schools with large percentages of children from families receiving Aid to Families with Dependent Children (AFDC) scored more poorly than those with small percentages of such children. Further, as children moved from grade two to grade three, those in schools with large percentages of children from AFDC families fell further behind in reading achievement.

7. The schools in elementary school districts scored higher than those in unified school districts and showed greater achievement gains between 1975-76 and 1976-77.

Method of Analysis

Just as in pupil-level analysis, figures are presented in this section for grade-two and grade-three pupils in both 1975-76 and 1976-77. School achievement levels are expressed in mean percent correct scores in Table 15 and in percent scoring below the first quartile in Table 16. Schools are divided into five groups of approximately equal numbers, for each background factor. The distribution of pupils among these five equal groups is shown in the "Percent of Pupils" column of Table 17. One can see where there exist greater-than-average concentrations of pupils with each background characteristic.

Percentile Level Analysis

School percent correct scores increased from 1975-76 to 1976-77 in both grade two and grade three, as one would expect from the rise in pupil-level achievement. However, the gains were more pronounced when viewed at the school level. While the mean pupil percent correct score increased .7 percent in grade two and .3 percent in grade three, the scores of the median school in the state increased 1.4 percent in grade two (from 70.2 to 71.6) and .7 percent in grade three (from 84.4 to 85.1). All schools, however, did not gain equally. Table 18 shows that the lowest-scoring schools in both grades two and three (those at the 5th percentile) reversed the downward trend of the previous year and made small gains in 1976-77. However, these schools still were below their levels of 1974-75. In both grades, the greatest gains in 1976-77 were made by schools of somewhat below-average achievement. In grade two the schools at the 30th and 40th percentiles each gained nearly 2 percent from 1975-76 to 1976-77. In grade three the schools at the 10th and 20th percentiles gained 1.3 percent and 1.2 percent, respectively.

These scores differed somewhat from the results of 1975-76. At that time low-scoring schools showed losses from the previous year, while high-scoring schools showed gains. This led to concern over a "widening of the gap" between high-achieving and low-achieving schools. The results for 1976-77 indicated that in grade three this gap did not increase. In grade two in 1976-77, the lowest-achieving schools did not gain quite as much as those above them; thus, the gap increased slightly.

Entry Level Test Score

The Entry Level Test is a school-readiness test given to all grade one pupils

in the state during their first month of school. It provides baseline data against which grade two and grade three Reading Test results are compared.

Table 17 shows that, with schools distributed in five equal groups, pupils' beginning reading ability was unevenly distributed. The lowest 20 percent of schools in 1976-77 contained nearly 25 percent of all pupils. This indicated that the lowest-scoring schools had large pupil enrollments, a finding discussed in more detail in the section on school size.

The number of schools achieving at the highest and lowest levels on the Entry Level Test increased between 1975-76 and 1976-77. This is shown in Table 17 by the greater percents of schools that scored above 29.50 or below 25.42 in 1976-77 than in 1975-76.

The scores made on the Entry Level Test were closely related to achievement on the later Reading Test in grades two and three. In fact, the Entry Level Test scores and a school's socioeconomic level were the two highest correlates of Reading Test performance. Tables 15 and 16 show the relationship between Entry Level Test scores and Reading Test achievement. Figure 11 portrays this relationship graphically. For instance, in 1976-77, the schools within the highest one-fifth of Entry Level Test scores had average grade three Reading Test scores of 90.4 percent correct. In contrast, the schools in the lowest one-fifth of Entry Level Test scores averaged only 69.2 percent correct on the Reading Test. Likewise, among the schools in the highest one-fifth on the Entry Level Test, less than 10 percent of the pupils were below the first quartile on the Reading Test, as shown in Table 16. In contrast, in schools in the lowest one-fifth, almost 50 percent of the pupils scored below the first quartile on the Reading Test. Thus, seemingly small differences in Entry Level Test scores were reflected as substantial differences on the Reading Test.

Table 15 also confirms that the greatest gains between 1975-76 and 1976-77 were made by schools just below the statewide average. Here, schools in the 25.43 to 27.22 and 27.23 to 28.46 groups gained the most in both grades two and three. The gains of the lowest and highest groups were similar.

Table 16 shows that the percents of pupils who scored below the first quartile on the Reading Test remained about the same for each group between grade two and grade three in 1976-77. This indicated that there was no widening of the gap in achievement between the highest-scoring and lowest-scoring pupils as they progressed from grade two to grade three and that they remained in about the same relative position.

Socioeconomic Index

A school's socioeconomic status was determined from information provided by teachers regarding the occupation of the principal breadwinner in the pupil's family. For the school-level analysis, the data were averaged across each school to produce a school socioeconomic index. The index ranged from a low socioeconomic level of 1.0 to a high of 3.0.

Table 17 shows that a school's socioeconomic level and its size were not directly related. Thus, while the schools of the lowest socioeconomic level had a dis-

proportionately large number of pupils, so did those of the highest socioeconomic level. The schools in the middle of the range were smaller. Additionally, the discrepancy between the percent of schools in a socioeconomic category and the percent of low socioeconomic level pupils in them (for example, the lowest 19.5 percent of schools in 1976-77 contained 21.4 percent of all pupils) was less than the discrepancy for Entry Level Test scores (where the lowest 20.0 percent of schools contained 24.7 percent of the pupils).

Statewide, the socioeconomic level increased from 1975-76 to 1976-77, as noted earlier. In 1975-76, 20.0 percent of the schools had socioeconomic indexes of 1.76 or below. This figure decreased to 19.5 percent in 1976-77. Similarly, schools in the highest status category increased from 19.9 percent to 20.3 percent.

Like the Entry Level Test score, the socioeconomic status of a school had a high correlation with grade two and grade three reading achievement. Most of the findings about the effect of Entry Level Test scores, reported in the last section, also held true for socioeconomic status. The schools near the statewide average in socioeconomic status made the greatest gains between 1975-76 and 1976-77. In the schools in the lowest 20 percent in socioeconomic status, more than five times as many pupils scored below the first quartile than those of the highest 20 percent in socioeconomic status. The achievement gap between schools of high and low socioeconomic level remained about the same between grades two and three. The only observable difference between dividing schools on the basis of socioeconomic index and dividing them on Entry Level Test score is that the achievement gap between high and low socioeconomic schools widened between 1975-76 and 1976-77. No such widening was reported between schools with the highest and lowest Entry Level Test scores. In percent correct scores, the lowest socioeconomic status schools gained .1 percent in both grades two and three. The highest-level schools gained .7 percent in grade two and .3 percent in grade three. While this widening of the gap was small, it was significant that it appeared when scores were analyzed by socioeconomic level but not when analyzed by Entry Level Test scores.

School Size

School size was reported in terms of the number of pupils who took the Reading Test at each grade level rather than the overall enrollment of a school. In Tables 15 and 16, these schools are divided into five categories of size, each having approximately the same number of schools.

The smallest schools had the highest test scores, as reported in Table 15. As larger and larger schools were studied, only gradual declines in scores were noted (see Figure 12). However, the largest schools scored substantially below the others. The smallest schools also achieved the greatest gains between 1975-76 and 1976-77. Their percent correct scores increased 1.2 percent in grade two and .7 percent in grade three. The largest schools gained .5 percent in grade two and lost .1 percent in grade three.

The relationship between school size and Reading Test achievement was not entirely clear. Large schools, which scored lower than small schools, generally also had lower Entry Level Test scores and greater numbers of pupils from

families receiving Aid to Families with Dependent Children. Both of these last two factors are associated with lower reading achievement. However, it is not accurate to characterize large schools only by these two background factors; schools of both the lowest and highest socioeconomic levels tended to be large schools, as reported in the section on socioeconomic status. Therefore, the impact of school size per se on reading achievement probably was minimal, or at least considerably less than the Entry Level Test scores or socioeconomic status.

English Fluency

Information on the pupils' bilingualism was provided by teachers at the time they administered the Reading Test. All pupils who spoke English and a second language and those classified as non-English speaking were characterized as bilingual for the purposes of this report. Tables 15, 16 and 17 show the schools divided into five approximately equal groups and the concentration of bilingual pupils in each.

The schools with few bilingual pupils tended to be small in size, as shown in Table 17. The percent of schools having low concentrations of bilingual pupils (0 to 3.5 percent) decreased between 1975-76 and 1976-77, while the percent having high concentrations (29.7 percent and above) increased. This is consistent with the pupil-level figures, which showed a decrease in the percents of pupils who spoke English only.

The schools with the fewest bilingual pupils scored highest on the Reading Test, as shown in Table 15 and Figure 13. There were substantial differences in scores between schools having the highest and lowest percents of bilingual pupils, although these achievement differences were not as pronounced as those between the highest and lowest schools in either Entry Level Test scores or socioeconomic level. The pupils in the 20 percent of schools with the greatest bilingualism were three times as likely however, to score below the first quartile than the pupils in the 20 percent of schools with the least bilingualism.

The schools with the fewest bilingual pupils achieved the greatest gains in reading scores between 1975-76 and 1976-77. School gains became less as the concentration of bilingual pupils increased. However, the relative achievement levels of schools in the five bilingual categories remained fairly constant as pupils progressed from grade two to grade three. This is shown in Table 16.

Percent of Pupils from Families Receiving Aid to Families with Dependent Children

During the 1976-77 year each school reported the number of its pupils that were from families receiving Aid to Families with Dependent Children (AFDC). An AFDC rate was computed by dividing that number by the school's total enrollment. Tables 15, 16, and 17 show the schools divided into five approximately equal size groups and the relative concentration of pupils from AFDC families.

Schools with high AFDC rates tended to be larger schools, as shown in Table 17. The AFDC rate decreased from 1975-76 to 1976-77, which was reflected in an

increase in the percent of schools having low (0 to 3.5 percent) AFDC rates and a decrease in those with high (24.6 percent or higher) rates.

AFDC rate was the third highest correlate of Reading Test scores, after Entry Level Test scores and socioeconomic status. As one would expect, the correlation of the AFDC rate with each of these latter two factors was high. However, an analysis of the AFDC breakdown provided two additional findings (see Figure 14). First, test scores dropped sharply between 1975-76 and 1976-77 among schools having a fairly high AFDC rate (the 14.6 to 24.5 percent category), as shown in Table 15. Grade two scores fell 1.1 percent and grade three scores dropped .9 percent. In grade two all other groups made moderate progress. In grade three, however, there was a trend for the schools with the highest concentration of pupils from AFDC families to make less progress.

Second, the achievement gap between the schools with the greatest concentrations of pupils from AFDC families and the other schools increased somewhat as children moved from grade two to grade three. Table 16 shows that the percent of pupils scoring below the first quartile increased between grades two and three for the schools with the highest percent AFDC (those with rates of 24.6 or higher), while the percent either declined or increased at a lower rate in the other four categories. This finding is just the opposite of that in the analyses using Entry Level Test scores or socioeconomic status. While these other factors showed no evidence of widening the achievement gap, the AFDC figures show that children in high percent AFDC schools were slightly farther behind their peers at the end of the third grade than at the end of the second grade.

Elementary or Unified School District

In California, elementary schools belong to one of two types of school districts: elementary or unified. Elementary school districts include kindergarten through grade eight (at which time the pupil moves up to a high school district). Unified school districts include kindergarten through grade twelve. There is a very general trend for unified districts to be in urban and suburban areas and for elementary districts to be in rural areas.

More than two-thirds of the grade two and grade three pupils tested were enrolled in unified districts. Reading Test scores were higher for second- and third-grade pupils in elementary districts than for those in unified districts in 1976-77. Additionally, the scores of pupils in elementary districts increased more from 1975-76 to 1976-77 than those of pupils in unified districts.

Table 15

Reading Test Scores for All Schools According to Entry Level Test Score, Socioeconomic Index, Size, Percent Bilingual, Percent AFDC and Type of School District
Grades Two and Three, 1975-76 and 1976-77

Subgroups	Grade 2			Grade 3		
	1975-76	1976-77	Difference	1975-76	1976-77	Difference
Mean Entry Level Test Score						
10.00 - 25.42	53.4	53.9	+ .5	69.0	69.2	+ .2
25.43 - 27.22	64.4	65.8	+1.4	79.6	80.1	+ .5
27.23 - 28.46	70.7	71.9	+1.2	84.6	85.1	+ .5
28.47 - 29.49	75.8	76.3	+ .5	87.6	87.9	+ .3
29.50 - 35.00	80.0	80.6	+ .6	90.2	90.4	+ .2
Socioeconomic Index						
1.00 - 1.76	53.2	53.3	+ .1	68.6	68.7	+ .1
1.77 - 2.03	63.3	64.0	+ .7	78.5	78.7	+ .2
2.04 - 2.25	69.0	70.8	+1.8	83.4	84.0	+ .6
2.26 - 2.51	74.0	75.2	+1.2	86.6	87.1	+ .5
2.52 - 3.00	80.1	80.8	+ .7	90.3	90.6	+ .3
Number of Pupils Tested per Grade						
1 - 39	70.3	71.5	+1.2	83.4	84.1	+ .7
40 - 57	70.0	71.3	+1.3	83.6	84.1	+ .5
58 - 74	69.6	70.3	+ .7	83.0	83.4	+ .4
75 - 95	68.3	68.5	+ .2	82.0	81.8	- .2
96 - high	62.2	62.7	+ .5	76.9	76.8	- .1
Percent Bilingual Pupils						
0.0 - 3.5	73.9	75.2	+1.3	86.0	87.0	+1.0
3.6 - 7.7	73.3	74.8	+1.5	85.7	86.7	+1.0
7.8 - 14.2	71.3	72.5	+1.2	84.6	84.9	+ .3
14.3 - 29.6	67.1	67.9	+ .8	81.2	81.3	+ .1
29.7 - 100.0	56.0	56.7	+ .7	71.5	71.9	+ .4
Percent of Pupils Receiving Aid to Families with Dependent Children						
0.0 - 3.5	79.4	80.0	+ .6	89.8	90.0	+ .2
3.6 - 8.3	74.0	74.7	+ .7	86.8	86.9	+ .1
8.4 - 14.5	69.6	70.1	+ .5	83.8	83.3	- .5
14.6 - 24.5	63.7	62.6	-1.1	78.5	77.6	- .9
24.6 - 100.0	55.1	55.6	+ .5	70.6	70.5	- .1
Unified	66.5	67.2	+ .7	80.3	80.6	+ .3
Elementary	69.8	70.9	+1.1	83.4	83.9	+ .5

Table 16

Percent of Pupils in California Scoring Below First Quartile on Reading Test, 1976-77, Reported by Categories of Schools

	Grade Two	Grade Three
Mean Entry Level Test Score		
10.00-25.42	48.4	48.3
25.43-27.22	27.9	28.4
27.23-28.46	19.2	18.8
28.47-29.49	13.3	13.3
29.50-35.00	8.4	8.8
Socioeconomic Index		
1.00-1.76	49.3	49.2
1.77-2.03	30.8	30.9
2.04-2.25	20.6	20.9
2.26-2.51	14.7	14.9
2.52-3.00	8.4	8.4
Number of Pupils Tested per Grade		
1-39	20.7	20.7
40-57	21.1	20.7
58-74	22.3	22.0
75-95	25.1	25.2
96-high	34.5	33.8
Percent of Bilingual Pupils		
0.0- 3.5	15.3	15.4
3.6- 7.7	15.9	15.7
7.8- 14.2	19.4	19.1
14.3- 29.6	25.3	26.1
29.7-100.0	43.5	43.1
Percent of Pupils Receiving Aid to Families With Dependent Children		
0.0- 3.5	9.2	9.4
3.6- 8.3	15.6	15.4
8.4- 14.5	21.8	22.3
14.6- 24.5	33.8	32.8
24.6-100.0	45.2	46.1
Unified	27.4	27.2
Elementary	21.2	21.1

Table 17

Percent of Schools and Pupils in Various Categories,
Grade Three

Category	Percent of Pupils		Percent of Schools	
	1975-76	1976-77	1975-76	1976-77
Mean Entry Level Test Score				
10.00 - 25.42	24.0	24.7	19.8	20.0
25.43 - 27.22	20.7	19.4	21.4	20.0
27.23 - 28.46	19.9	19.0	21.2	20.1
28.47 - 29.49	18.5	19.1	18.9	19.9
29.50 - 35.00	16.8	17.8	18.7	20.0
Socioeconomic Index				
1.00 - 1.76	21.1	21.4	20.0	19.5
1.77 - 2.03	19.9	19.7	20.5	20.6
2.04 - 2.25	19.5	19.1	19.9	19.8
2.26 - 2.51	18.9	19.2	19.7	19.8
2.52 - 3.00	20.6	20.7	19.9	20.3
Number of Pupils Tested per Grade				
1 - 39	9.0	9.7	24.3	25.3
40 - 57	18.7	20.0	23.3	24.7
58 - 74	23.5	22.7	22.3	21.0
75 - 95	22.4	23.6	16.5	17.1
95 - high	26.3	24.1	13.5	11.9
Percent Bilingual Pupils				
0.0 - 3.5	16.0	14.8	20.1	19.5
3.6 - 7.7	20.3	20.0	20.2	19.8
7.8 - 14.2	20.0	19.6	19.7	19.1
14.3 - 29.6	20.5	21.2	20.0	20.7
29.7 - 100.0	23.1	24.3	20.0	20.9
Percent of Pupils Receiving Aid to Families with Dependent Children				
0.0 - 3.5	19.8	20.9	20.2	21.5
3.6 - 8.3	18.0	19.0	19.8	21.0
8.4 - 14.5	18.5	19.1	20.0	20.5
14.6 - 24.5	20.4	20.6	19.9	19.7
24.6 - 100.0	23.3	20.4	20.1	17.3
Unified	--	67.2	--	61.7
Elementary	--	32.8	--	38.3

Table 18

Reading Test Scores for Schools at Various School Percentile Ranks
Grades Two and Three, 1974-5 Through 1976-77

School Percentile Rank	Grade 2				Grade 3			
	1974-75	1975-76	1976-77	Difference*	1974-75	1975-76	1976-77	Difference*
5	48.0	47.4	47.6	+ .2	64.9	63.9	64.4	+ .5
10	52.9	52.5	53.1	+ .6	69.3	68.6	69.9	+1.3
20	58.5	58.4	60.1	+1.7	75.2	74.8	76.0	+1.2
40	67.3	66.7	68.6	+1.9	82.3	82.2	82.7	+ .5
60	73.3	73.5	74.5	+1.0	86.6	86.6	87.1	+ .5
80	79.2	79.5	80.5	+1.0	90.1	90.2	90.7	+ .5
90	83.2	83.4	84.0	+ .6	92.1	92.3	92.7	+ .4
95	85.9	86.2	86.7	+ .5	93.8	93.8	94.1	+ .3

* 1976-77 score minus 1975-76 score

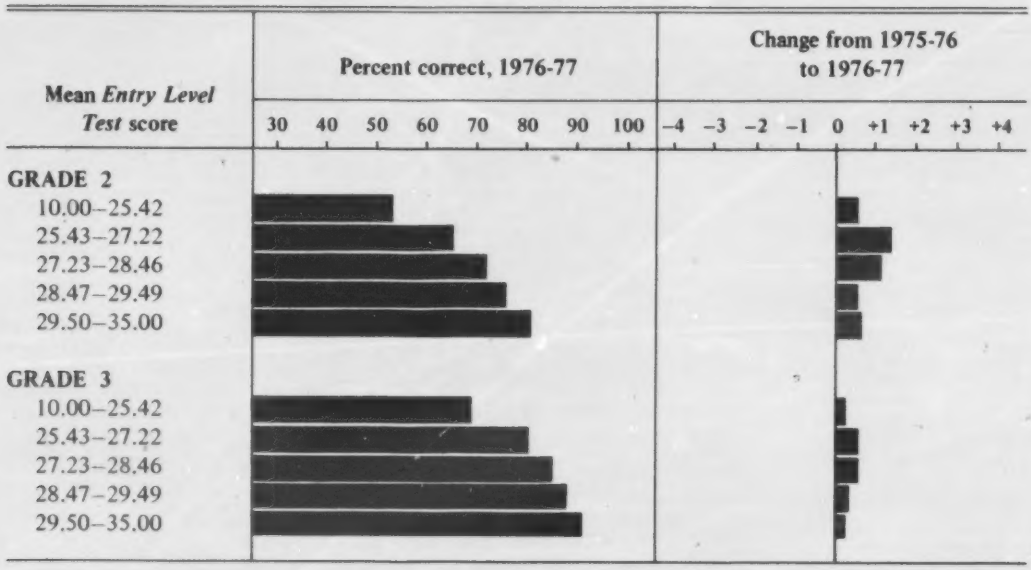


Fig. 11. *Reading Test* scores for all schools according to *Entry Level Test* score, grades two and three, 1975-76 and 1976-77

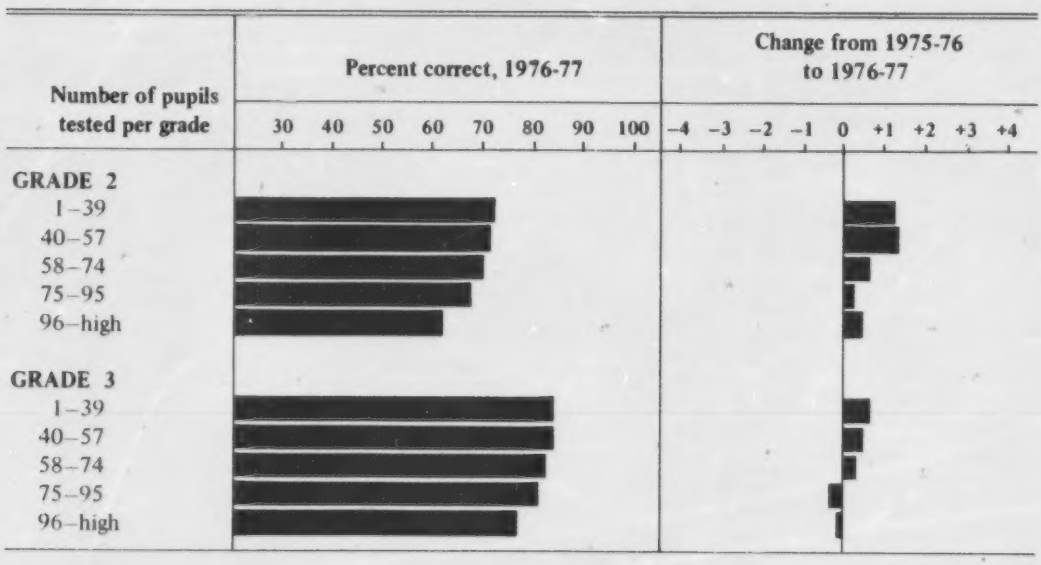


Fig. 12. *Reading Test* scores for all schools according to number of pupils tested per grade, grades two and three, 1975-76 and 1976-77

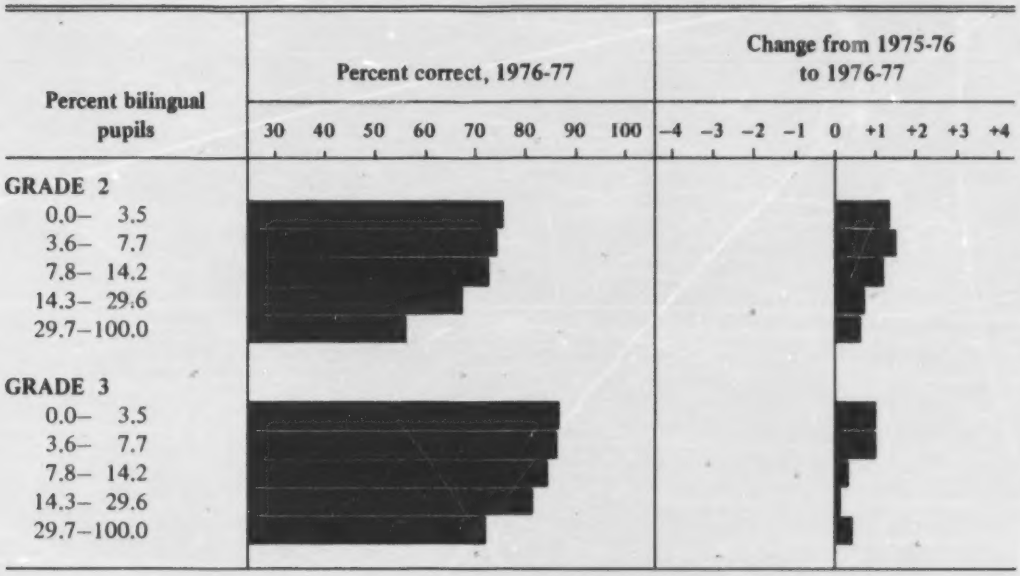


Fig. 13. *Reading Test* scores for all schools according to percent bilingual pupils, grades two and three, 1975-76 and 1976-77

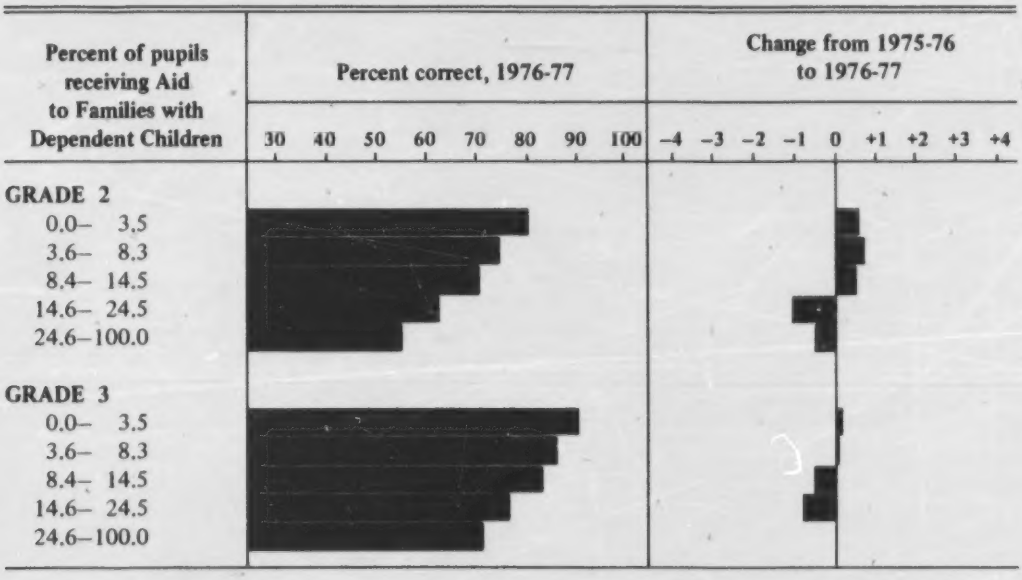


Fig. 14. *Reading Test* scores for all schools according to percent of pupils receiving aid to families with dependent children (AFDC), grades two and three, 1975-76 and 1976-77

A Student-Level Analysis of Achievement and Background Factors, Grades Six and Twelve

As part of the administration of the Survey of Basic Skills: Grade 6, teachers provided information on the English language fluency of each student and about any second language that each student spoke. The test results were analyzed to determine any differences among the groups of students.

Summary of Findings

1. Reading and math test scores were higher for students who spoke English only than for those who spoke fluent English and another language. However, the scores of the students who spoke fluent English and a language other than Spanish scored higher than those students who spoke English only.

2. The reading test scores of the students who spoke English only did not change, whereas the reading scores of the students who spoke fluent English and limited-English declined. The mathematics test scores of students who spoke English only and those who spoke fluent English and another language improved more than those for limited-English speaking students.

3. Girls score higher than boys in reading and boys perform better than girls in mathematics, at both grades six and twelve. The relative differences were about the same as in 1976.

Analysis of Findings

English Language Fluency. The grade-six teachers indicated on each pupil's booklet the pupil's fluency in English and any other language that the student spoke. Figure 15 shows the percents of pupils that fell within the various categories of fluency in English and the percents of the students who spoke other languages. The reading and mathematics scores, by fluency in English and language spoken, are presented in Table 19 and are shown graphically in Figure 16.

There was an overall decrease of .2 percent correct in the reading scores in 1976-77 from that of 1975-76. The data for reading show that all subgroups did not follow the statewide trend; the scores of the students who spoke only English did not change. Although the scores of the students who spoke fluent English and another language decreased overall, the scores of those whose other language was Chinese or a Philippine dialect increased. This means that much of the drop in the scores of the students who spoke fluent English and another language was the result of the scores of those students whose other language was Spanish. This was so because of the lower-than-average scores of the students who spoke fluent English and Spanish, who comprised two-thirds

of the students in this category. The same is true in the limited English and other language category--the decrease in the scores for those who spoke Spanish accounts for most of the decline in the category as a whole.

In mathematics, the overall score increased by .3 percent in 1976-77 over that of 1975-76. The mathematics scores of students who spoke English only and those who spoke fluent English and another language improved in 1976-77. However, the scores remained essentially unchanged for limited-English-speaking students. Table 19 shows that in both 1975-76 and 1976-77, the mathematics scores of the students who spoke English only exceeded the statewide averages and that the scores of the students who spoke fluent English and another language were below the statewide average. The breakdown of scores in Table 19 and Figure 16 reveals that the lower-than-statewide average of students who spoke fluent English and another language was due to the students (77 percent) whose other language was Spanish. It is also interesting to note that limited-English students who spoke Chinese and Japanese (a very small number statewide) scored above the English-only students.

Sex Differences. The sex of each pupil was coded on the test booklet at the time of testing. Table 20 shows the scores for reading and mathematics by sex for grades six and twelve.

It can be seen that girls do better than boys in reading, especially at grade six. The statewide average in reading declined slightly at both grades. Girls declined very slightly more than boys at grade six and very slightly less at grade twelve.

Table 20 also shows that boys do better than girls in mathematics at both grade levels. Contrary to reading scores, the greatest difference is in grade twelve, where boys do considerably better. Since 1975-76, scores for both boys and girls improved in grade six (boys very slightly more) and declined in grade twelve (girls very slightly more).

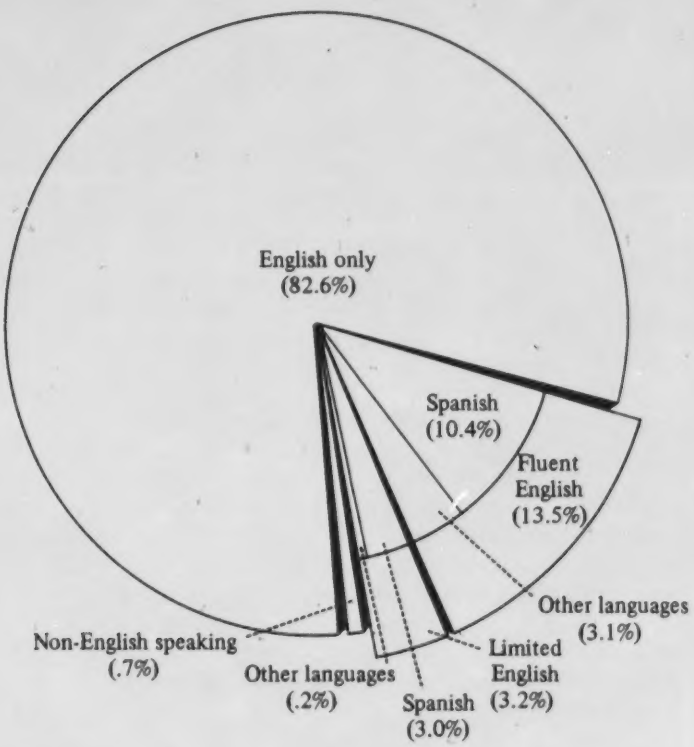


Fig. 15. Distribution of California grade six students according to English language fluency and other language spoken, as coded by their teachers

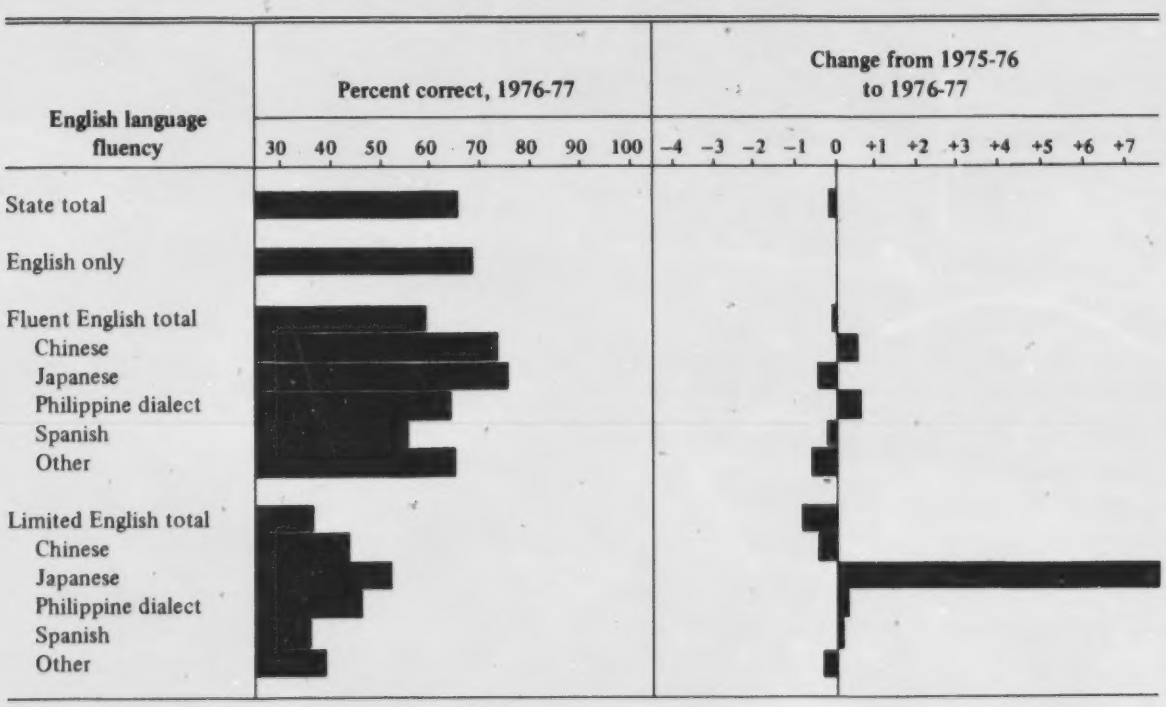


Fig. 16. *Survey of Basic Skills* reading scores by English language fluency and other language spoken, grade six, 1975-76 and 1976-77

Table 19

Survey of Basic Skills Scores for Reading and Mathematics by English Language Fluency
Grade Six
1975-76 and 1976-77

English Language Fluency	Other Language Spoken	Percent of Pupils	Reading			Mathematics		
			1975-76	1976-77	Difference	1975-76	1976-77	Difference
State Total		100.0[a]	66.1	65.9	- .2	57.4	57.7	+ .3
English Only		82.6	68.2	68.2	-0-	58.5	59.1	+ .6
Fluent English	Total	13.5	58.6	58.5	- .1	52.2	53.0	+ .8
	Chinese	.5	73.4	73.9	+ .5	69.3	71.0	+1.7
	Japanese	.3	76.6	76.2	- .4	68.9	69.5	+ .6
	Philippine Dialect	.6	64.3	64.9	+ .6	58.0	59.0	+1.0
	Spanish	10.4	55.7	55.5	- .2	49.3	50.0	+ .7
	Other	1.7	66.3	65.7	- .6	58.8	60.6	+1.8
Limited English	Total	3.2	38.7	37.8	- .9	43.2	43.3	+ .1
	Chinese	.1	43.9	43.4	- .5	60.0	59.4	- .6
	Japanese	.0	44.5	52.3	+7.8	60.9	66.1	+5.2
	Philippine Dialect	.1	44.4	47.2	+2.8	48.5	47.5	-1.0
	Spanish	2.6	38.0	36.7	-1.3	40.6	40.6	-0-
	Other	.4	39.4	39.1	- .3	52.8	52.5	- .3

[a] Includes .7 percent who were identified as non-English speaking.

Table 20

Survey of Basic Skills Scores for Reading and Mathematics by Sex
Grades Six and Twelve
1975-76 and 1976-77

Sex	Grade Six						Grade Twelve					
	Reading			Mathematics			Reading			Mathematics		
	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference
State Total	66.1	65.9	- .2	57.4	57.7	+ .3	64.1	63.6	- .5	67.0	66.3	- .7
Boys[a]	64.7	64.5	- .2	57.5	57.9	+ .4	64.0	63.4	- .6	69.4	68.7	- .7
Girls[b]	67.5	67.2	- .3	57.2	57.5	+ .3	64.3	63.8	- .5	64.	63.9	- .8

[a] Boys represent 50.5 percent of the students tested in grade six and 49.5 percent of the students tested in grade twelve.

[b] Girls account for 49.5 percent of the students tested in grade six and 50.5 percent of the students tested in grade twelve.

School-Level and District-Level Analyses of Achievement and Background Factors, Grades Six and Twelve

This section contains an analysis of the test results of students in grades six and twelve in relation to the background factor data available at the school level. In those cases where the same background characteristic data were also available and analyzed at the student level, the school-level analysis complements the previous student-level analysis.

The reader should be cautious in interpreting the results from the analysis in this section. It is not possible to determine which background characteristics caused test scores to be high or low. Any conclusions made about causal relationships would be erroneous.

Summary of Findings

1. The schools in the low percentile rankings generally showed a decline in scores between 1975-76 and 1976-77, and those in very high rankings showed improvement within the same period.

2. The schools with the lowest concentration of bilingual students scored higher than those with the highest concentrations of such students. Generally, the schools with the fewest bilingual students also made greater achievement gains between 1975-76 and 1976-77 than those with the most bilingual students.

3. The schools in large urban areas scored the lowest; those in small and medium-size communities scored the highest.

4. Relatively large schools tended to score higher than small schools.

5. Sixth-grade students in elementary school districts scored higher than those in unified school districts; twelfth-grade students in high school districts scored higher than those in unified school districts.

6. Schools with larger percents of students whose parents were receiving benefits under the Aid to Families with Dependent Children (AFDC) program scored lower than those with smaller percents of such pupils. In general, schools with higher percents of students from AFDC families showed a decline in scores between 1975-76 and 1976-77, and the schools with smaller percents of students from AFDC families showed an improvement in scores between the same period.

Percentile Level Analysis

Table 21 gives the school-level percentile rankings of reading, written expression, and mathematics scores for grades six and twelve for 1975-76 and 1976-77. From these percentile rankings it is possible to pin-point the clusters of schools in which the scores declined, remained steady, or increased over a period of two years.

For grade-six reading, for example, in 1975-76 a raw score of 48.2 corresponded to the 5th percentile school. In 1976-77 a raw score of 47.5 corresponded to the 5th percentile, indicating a decline of 1 raw score at this percentile point. One can see from Table 21 that scores declined for schools in the lower percentile ranges and remained steady or even increased slightly for those in the higher percentile categories. The written expression scores dropped only for the schools in the 5th percentile range; the scores increased for all other schools. The mathematics scores increased for schools in all percentile ranges; however, the increases were slightly more pronounced for higher percentile schools. In summary, those schools that are in the 10th percentile or lower, showed minimal or no growth and those in the upper percentile ranges showed accelerated growth. One can safely infer that the gap between the lowest achieving schools and the highest achieving schools increased in 1976-77.

The percentile rankings for reading in grade twelve shows that scores declined for all schools except those in the upper 5 percent category. The percentile rankings for written expression and mathematics show that all schools declined and that the schools in the lower percentile ranks had a tendency to decline more.

Tables 23 and 24 give the percentile rankings of the scores at the district level. For grade twelve reading, declines occurred in districts at all percentile points except those between the 40th and 60th percentiles. The written expression and mathematics scores increased for all rankings, but the greatest increases tended to be in the districts at the higher percentile rankings. For grade twelve the scores dropped in each of the three areas; the declines tended to be greatest in the districts at the lower percentile ranks.

Percent Bilingual

The percent bilingual figure at the school level was calculated from the information available on "other language" for each pupil. The percent bilingual is the percent of students in a school who speak any language other than English and who may or may not speak English. Table 25 gives the breakdown of reading and mathematics scores, by percent bilingual.

In 1976-77, reading scores declined slightly in schools that had 1.3 percent or less bilingual students. In schools that had 1.4 percent to 11.8 percent bilingual students, the reading scores increased slightly. There was almost no change in scores in schools that had 26.6 percent or more bilingual students. In mathematics, there was a slight increase in scores in all categories of schools.

Location of the School

Each school in California was placed in one of five categories on the basis of the population of the surrounding community: (1) city of 300,000 or more population; (2) city of 100,000 or more but less than 300,000 population; (3) community of 25,000 or more but less than 100,000 population; (4) community of 2,500 or more but less than 25,000 population; or (5) rural area, less than 2,500 population. The reading and mathematics test scores of schools in these communities are shown in Table 26.

As was found in 1975-76, grade-six reading scores were highest for schools in location categories (3) and (4), middle size communities. The schools in category (1), very large cities, had the lowest test scores.

A comparison of changes from 1975-76 to 1976-77 showed that the schools in all categories of school location followed the overall statewide trends both in grade six and grade twelve. Statewide increases in sixth-grade mathematics scores, for example, are shown as increases in scores for all categories of school locations. Likewise, statewide decreases in scores are shown as decreases in scores for all categories of school locations.

Size of School

The number of students tested in a grade was used as a measure of school size; schools having large numbers of students tested were considered large schools. Tables 27 and 28 show the average of school-level test scores, by type of district to which the schools belonged and by size of school. Tables 29 and 30 give the average of district-level test scores for reading and math, by type of district and by size of district.

Tables 27 and 28 show that the scores of schools in elementary school districts exceeded those in unified school districts and that the scores of schools in high school districts exceeded those in unified school districts. At the sixth-grade level, the test scores were highest for schools in which the number of students tested was between 79 and 101 for schools in unified school districts and schools in elementary school districts. The scores were lowest for schools in which the number of students tested exceeded 102.

Tables 29 and 30 give the results of the district-level analysis. In the district-level analysis, however, the differences between the test scores of the unified school districts and those of the elementary school districts or between those of the unified school districts and those of the high school districts were not at sharp as those revealed in the school-level analysis.

The comparison of the results across 1975-76 and 1976-77 at grade six revealed that the statewide drop in grade six reading scores resulted primarily from declines in the large schools, especially those in which the number of students tested exceeded 102. Although there was a statewide increase in mathematics scores in grade six, the scores actually declined in schools in which the number of students tested exceeded 102. The sixth-grade mathematics scores increased, however, for the rest of the categories of school size.

The comparison of school-level results across years at grade twelve (see Table 28) revealed an interesting pattern of growth for schools in unified districts--the very small, the middle size and the largest schools declined in both reading and math whereas the medium-small stayed about the same, and the medium-large actually improved. No clear pattern emerged for high school districts.

The review of the district-level results across years at grade six showed that reading scores remained the same in the elementary school districts and that the scores in small and medium-size unified districts declined the most. Slight increases in mathematics scores were noted in elementary districts of all sizes and in all unified districts except those of medium size (48 to 138 students tested), in which the scores declined. The breakdown of the results for high school districts indicated that scores increased slightly for small districts (1 to 87 students tested) and that scores dropped very slightly in the largest high school districts. A similar breakdown of scores for unified school districts showed that for reading the declines in scores were spread across all sizes of districts; however, the largest declines were in the smallest districts--those having 1 to 87 students tested. For mathematics at grade twelve, the scores of all unified districts decreased, although more so for small districts. The trend was reversed for high school districts, with the smallest districts gaining the most.

Percent AFDC

Data were available at the school level on the percent of students whose parents were recipients of funds from the Aid to Families with Dependent Children (AFDC) program. The correlation of the percent AFDC with achievement at both grades six and twelve was moderately high. Tables 31 and 32 show the test scores of schools, by five categories of percent AFDC. The five categories of percent AFDC were constructed so that approximately an equal number of schools fell in each of the five categories.

The examination of Tables 31 and 32 showed that test scores were highest in the schools or districts with the fewest students from AFDC families. The scores were lowest for schools with a large number of students from AFDC families. Tables 31 and 32 are particularly revealing when scores are compared across 1975-76 and 1976-77 for each category of percent AFDC.

Table 31 for grade six reading shows that scores remained steady for schools in which the percent AFDC was low (8.3 percent or lower). The reading scores declined in schools in which the percent AFDC exceeded 8.3 percent. This means that the statewide drop in reading scores at grade six was primarily in the schools in which the percent AFDC was more than 8.3 percent. Similarly, Table 31 for grade six mathematics shows that the scores increased for approximately one-half of the schools; those for which the percent AFDC was below the average; for the other schools with above average percent AFDC, the scores remained unchanged. The statewide increase in the overall mathematics score at grade six was, therefore, attributable to the increased scores in the schools with the lowest percent AFDC.

Table 21

Survey of Basic Skills Score by School Percentile Rank
Grade Six
1975-76 and 1976-77

School Percentile Rank	Reading			Written Expression			Mathematics		
	1975-76	1976-77	Difference	1975-76	1976-77	Difference	1975-76	1976-77	Difference
5	48.2	47.5	- .7	46.1	45.8	- .3	43.3	43.4	+ .1
10	53.0	52.2	- .8	50.0	50.1	+ .1	46.2	46.6	+ .4
20	58.1	57.9	- .2	55.0	55.6	+ .6	50.0	50.6	+ .6
40	65.0	65.0	-0-	61.3	62.2	+ .9	55.4	55.9	+ .5
60	69.7	69.7	-0-	66.0	66.9	+ .9	59.4	60.2	+ .8
80	74.4	74.6	+ .2	70.5	71.7	+1.2	64.4	65.2	+ .8
90	77.5	77.7	+ .2	73.9	75.0	+1.1	68.4	69.2	+ .8
95	80.2	80.0	- .2	76.7	78.0	+1.3	71.6	72.4	+ .8

Table 22

Survey of Basic Skills Score by School Percentile Rank
Grade Twelve
1975-76 and 1976-77

School Percentile Rank	Reading			Written Expression			Mathematics		
	1975-76	1976-77	Difference	1975-76	1976-77	Difference	1975-76	1976-77	Difference
5	52.9	52.2	- .7	51.4	50.6	- .8	54.2	53.0	-1.2
10	56.4	56.1	- .3	54.5	53.7	- .8	57.8	56.4	-1.4
20	59.4	58.8	- .6	57.6	57.1	- .5	61.0	60.2	- .8
40	62.8	62.1	- .7	60.8	60.1	- .7	65.0	64.0	-1.0
60	65.2	64.5	- .7	63.2	62.4	- .8	67.5	67.0	- .5
80	67.6	67.1	- .5	65.8	65.6	- .2	70.6	70.3	- .3
90	69.4	69.2	- .2	67.6	67.4	- .2	72.7	72.8	+ .1
95	71.1	70.7	- .4	69.7	69.3	- .4	75.7	75.3	- .4

Table 23

Survey of Basic Skills Score by District Percentile Rank
Grade Six
1975-76 and 1976-77

School Percentile Rank	Reading			Written Expression			Mathematics		
	1975-76	1976-77	Difference	1975-76	1976-77	Difference	1975-76	1976-77	Difference
5	51.4	50.4	-1.0	49.0	49.4	+ .4	44.7	45.9	+1.2
10	55.0	55.1	+ .1	51.9	53.2	+1.3	47.4	48.6	+1.2
20	59.7	59.7	-0-	56.0	57.6	+1.6	50.7	51.7	+1.0
40	65.4	65.7	+ .3	61.4	63.2	+1.8	55.3	56.2	+ .9
60	69.2	69.4	+ .2	65.6	66.8	+1.2	59.1	59.9	+ .8
80	73.8	73.6	- .2	69.8	71.2	+1.4	63.5	64.4	+ .9
90	78.6	77.4	-1.2	74.2	75.5	+1.3	68.9	70.1	+1.2
95	81.3	80.8	- .5	77.7	80.1	+2.4	72.4	74.5	+2.1

Table 24

Survey of Basic Skills Score by District Percentile Rank
Grade Twelve
1975-76 and 1976-77

School Percentile Rank	Reading			Written Expression			Mathematics		
	1975-76	1976-77	Difference	1975-76	1976-77	Difference	1975-76	1976-77	Difference
5	55.8	55.7	- .1	54.2	53.9	- .3	56.7	56.1	- .6
10	57.5	57.0	- .5	56.0	55.9	- .1	59.1	59.3	+ .2
20	60.2	59.5	- .7	58.4	58.1	- .3	61.6	61.2	- .4
40	63.1	62.3	- .8	61.1	60.3	- .8	65.0	63.8	-1.2
60	65.1	64.3	- .8	62.8	61.9	- .9	67.2	66.7	- .5
80	67.1	66.5	- .6	65.3	65.1	- .2	69.8	69.6	- .2
90	68.9	68.2	- .7	66.9	66.9	-0-	71.5	71.1	- .4
95	70.4	70.0	- .4	69.1	68.6	- .5	75.1	73.9	-1.2

Table 25

Survey of Basic Skills Scores for Reading and Mathematics by Percentage of Bilingual Pupils* in Each School
Grade Six
1975-76 and 1976-77

Percent ilingual	Reading			Mathematics		
	1975-76	1976-77	Difference	1975-76	1976-77	Difference
0.0- 1.3	71.0	70.0	-1.0	60.9	61.0	+ .1
1.4- 5.1	69.5	70.3	+ .8	60.0	60.9	+ .9
5.2- 11.8	68.2	68.7	+ .5	58.8	59.9	+1.1
1.9- 26.5	65.2	65.4	+ .2	56.3	57.5	+1.2
6.6-100.0	57.1	57.2	+ .1	50.7	51.8	+1.1

*Includes all pupils who speak a language other than English, and who may or may not also speak English.

Table 26

Survey of Basic Skills Scores for Reading and Mathematics by School Location
Grades Six and Twelve
1975-76 and 1976-77

Population of School Area	Reading						Mathematics					
	Grade Six			Grade Twelve			Grade Six			Grade Twelve		
	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference
Over 300,000	62.5	62.3	- .2	60.5	60.1	- .4	54.9	55.4	+ .5	63.3	63.1	- .2
100,000-300,000	66.1	66.0	- .1	63.5	63.1	- .4	57.7	58.1	+ .4	65.8	65.5	- .3
25,000-100,000	67.5	67.3	- .2	64.6	64.2	- .4	58.2	59.1	+ .9	67.1	66.7	- .4
2,500-25,000	67.4	67.4	-0-	63.3	63.1	- .2	58.0	58.4	+ .4	65.6	65.4	- .2
Under 2,500	66.6	66.4	- .2	63.1	61.5	-1.6	57.7	58.2	+ .5	65.0	63.8	-1.2

Table 27

Survey of Basic Skills Scores for Reading and Mathematics by Number Tested in Each School and by Type of District
Grade Six
1975-76 and 1976-77

Number Tested	Reading						Mathematics					
	Unified			Elementary			Unified			Elementary		
	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference
1-42	66.3	66.2	- .1	67.2	67.6	+ .4	57.8	58.1	+ .3	57.9	59.9	+2.0
43-61	65.7	65.4	- .3	67.2	67.6	+ .4	56.9	57.3	+ .4	58.3	59.5	+1.2
62-78	65.4	65.6	+ .2	67.6	67.5	- .1	56.7	57.4	+ .7	58.2	59.2	-1.0
79-101	66.7	66.2	- .5	68.5	68.4	- .1	57.4	57.9	+ .5	59.4	60.0	+ .6
102-409	63.7	62.8	- .9	66.9	66.1	- .8	55.6	55.3	- .3	57.8	57.3	- .5

Table 28

Survey of Basic Skills Scores for Reading and Math by Number Tested in School and by Type of District
Grade Twelve
1975-76 and 1976-77

Number Tested	Reading						Mathematics					
	Unified			High School			Unified			High School		
	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference
1-114	62.0	61.0	-1.0	62.0	62.0	-0-	63.2	62.0	-1.2	64.3	64.8	+ .5
115-264	61.8	61.7	- .1	62.5	62.1	- .4	63.8	63.7	- .1	64.5	63.7	- .8
265-356	62.4	61.7	- .7	64.4	63.7	- .7	64.8	63.9	- .9	66.9	66.3	- .6
357-469	63.5	63.9	+ .4	65.3	65.2	- .1	66.3	66.5	+ .2	67.8	68.0	+ .2
470-1,038	64.3	63.4	- .9	66.2	66.8	+ .6	67.4	66.6	- .8	69.7	70.3	+ .6

Table 29

Survey of Basic Skills Scores for Reading and Math by Number Tested in District and by Type of District
Grade Six
1975-76 and 1976-77

Number Tested	Reading						Mathematics					
	Unified			Elementary			Unified			Elementary		
	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference
1-20	70.5	65.6	-4.9	68.8	67.8	-1.0	55.5	58.8	+3.3	59.3	61.3	+2.0
21-47	66.5	69.0	+2.5	65.7	66.3	+ .6	58.1	58.1	-0-	57.2	57.8	+ .6
48-138	66.3	63.7	-2.6	65.6	65.7	+ .1	57.4	55.5	-1.9	55.9	56.7	+ .8
139-476	66.8	67.8	+1.0	67.5	67.6	+ .1	57.4	58.1	+ .7	57.9	58.7	+ .8
477-41,933	66.6	66.4	- .2	67.3	67.1	- .2	57.4	57.9	+ .5	58.2	58.9	+ .7

Table 30

Survey of Basic Skills Scores for Reading and Math by Number Tested in District and by Type of District
Grade Twelve
1975-76 and 1976-77

Number Tested	Reading						Mathematics					
	Unified			High School			Unified			High School		
	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference	75-6	76-7	Difference
1-87	62.8	60.4	-2.4	61.5	63.5	+2.0	64.8	62.5	-2.3	64.3	66.4	+2.1
88-202	63.2	62.6	- .6	61.6	61.9	+ .3	64.7	64.4	- .3	63.6	63.8	+ .2
203-424	63.8	63.5	- .3	62.8	61.9	- .9	66.3	65.9	- .4	64.6	64.2	- .4
425-897	64.7	63.9	- .8	65.7	65.1	- .6	67.4	66.6	- .8	68.1	67.9	- .2
898-30,481	63.9	63.7	- .2	65.2	64.9	- .3	66.6	66.3	- .3	67.9	67.8	- .1

Table 31

Survey of Basic Skills Scores for Reading and Mathematics by Percent of Students from Homes Receiving Aid to Families with Dependent Children
Grade Six
1975-76 and 1976-77

School Percent AFDC	Reading			Mathematics		
	1975-76	1976-77	Difference	1975-76	1976-77	Difference
0.0- 3.8	73.6	73.9	+ .3	64.0	64.8	+ .8
3.9- 8.3	70.1	70.2	+ .1	60.4	61.0	+ .6
8.4- 14.2	67.5	66.8	- .7	57.9	58.4	+ .5
14.3- 24.3	63.5	62.1	-1.4	54.7	54.6	- .1
24.4-100.0	55.8	54.9	- .9	49.3	49.3	-0-

Table 32

Survey of Basic Skills Scores for Reading and Mathematics by Percent of Students from Homes Receiving Aid to Families with Dependent Children
Grade Twelve
1975-76 and 1976-77

School Percent AFDC	Reading			Mathematics		
	1975-76	1976-77	Difference	1975-76	1976-77	Difference
0.0- 2.7	66.6	66.8	+ .2	69.6	70.0	+ .4
2.8- 5.4	65.4	64.7	- .7	68.1	67.3	- .8
5.5- 8.6	64.0	63.2	- .8	66.4	65.6	- .8
8.7-15.0	62.3	61.2	-1.1	64.3	63.2	-1.1
15.1-91.3	57.4	56.2	-1.2	58.8	57.4	-1.4

VIII. Comparisons with National Norms

Some of the difficulties in using publishers' national norms to judge the adequacy of the performance of California students are discussed in Chapter II. Briefly, the two main problems are lack of agreement from publisher's sample to publisher's sample and lack of timeliness. Any comparison based on a single publisher's norm group (a national sample of students tested at a given time) can be quite misleading and is a tenuous undertaking at best. Since no test is given nationwide, one must rely on various publishers' estimates of the nationwide distribution of test scores. These estimates vary from publisher to publisher and are clearly "guesstimates." Part of the problem in establishing norms is that publishers are dependent upon the goodwill and cooperation of the districts they select to administer their tests. When the districts that have been carefully selected as part of a national sample decline to particiipte in the norming study, the results become that much more uncertain. Also, because of the expense involved, publishers are not able to update their norms more than once every five to eight years.

To cope with this situation, the Department of Education compares the performance of California students with the norms of a variety of tests and updates the comparisons whenever the tests are renormed, or new tests become available. This is done by giving a sample of California students both the publisher's standardized test and the California test. In some cases, no extra testing is required. Scores for a publisher's standardized test are simply collected from school districts which administered that test to all of their students in certain schools for other purposes. The statistical techniques used to equate the two tests are briefly described in Appendix H. The result of this type of "equating study" is to show how California students would have compared to a national norm group if, in fact, all California students had taken the published test.

This approach has several advantages: (1) the national comparisons are more timely since they can be updated as new norms become available; (2) the estimates are more stable since they do not depend on the representativeness of a single publisher's sample; and (3) California students can be assessed with a test that fits the objectives of the instructional program and simultaneously, with almost no additional testing, can be compared to national norms.

The new comparisons presented in this report are based on the test with the most recent national norms available. Several major test batteries are now being revised and renormed. Future reports will convey the results of studies equating the California tests with those tests. This report also presents the results of earlier equating studies so the reader can inspect the long-term (from eight to twelve years) achievement test trends in California against the backdrop of national norms.

Grades Two and Three

Table 33 shows the estimated national percentile ranks of the median California pupil since 1965-66. The trend over the years is clearly one of growth, with the second grade going from a percentile rank of 28 to 38 on the Stanford Reading Test, from 50 to 53 on the Cooperative Primary Reading Test, and now from 54 to 55 on the Comprehensive Tests of Basic Skills. Similarly, third-grade performance climbed from the 34th percentile to the 56th percentile. Figure 17 provides a pictorial display of these trends. The following paragraphs should help the reader more fully understand the national comparisons.

1. The second-grade results for 1965-66 through 1969-70 and the third-grade results for 1966-67 through 1970-71 were based on the Stanford Reading Test which was administered to all pupils at those grade levels in California. The norms for the Stanford Reading Test were established in 1963. Thus, the gains that occurred each year are relative to those norms.

2. The second-grade results for 1970-71 through 1972-73 and the third-grade results for 1971-72 and 1972-73 were based on the Cooperative Primary Reading Test (CPRT), which was administered to all pupils at those grade levels in California. The norms for the CPRT were established in 1966. The dramatic increase of scores in the changeover years was due largely to the great differences between the norms of the Stanford Reading Test and those of the CPRT.

3. In 1973-74 the California Assessment Program developed the Reading Test. A systematic sample of one-ninth of all students tested in grades two and three was used in an equating study to estimate the performance of the median pupil in California relative to 1966 CPRT norms. The results indicated little change from those of the previous year.

4. In 1974-75, the Reading Test was revised and administered to all second and third grade pupils in California. The same test was used in 1975-76 and 1976-77. The results of an equating study, described in Appendix H, were used to estimate the performance of pupils in California relative to norms established in 1973 for the Comprehensive Tests of Basic Skills, Form S. As a result of the modest increases over the last two years, the median California pupil in grades two and three in 1976-77 was at the 55th and 56th percentiles, respectively, on the recent norms.

Grade Six

The performance of sixth graders in California declined in the early 1970s and leveled off in 1974. It has climbed since then. Table 34 shows that the median California sixth-grade student in 1976-77 was slightly above the national average (of a sample taken in 1973) in reading, mathematics, and language. Figure 18 presents these trends graphically. Reading performance, with a percentile rank of 53, continued to be slightly higher than that of language and mathematics. A more complete description of these findings is given below.

1. From 1969-70 to 1973-74 the Comprehensive Tests of Basic Skills (Form Q, 1968 norms) was administered to all California sixth-grade students. During this period the performance of California students declined from four to nine percentile ranks on the basis of the 1968 norms.

2. In 1974-75 the first version of the California Assessment Program test, the Survey of Basic Skills, was administered statewide. An equating study that was conducted that year showed that scores had improved and that if the Comprehensive Tests of Basic Skills had been administered statewide, the percentile ranks would have gone up to 48, 43, and 44 for reading, language, and math, respectively.

3. A revision of the Survey was administered in 1975-76 and 1976-77. An equating study, described in Appendix H, showed that on the basis of the 1973 version of the CTBS, California students improved enough in 1975-76 to equal or exceed the national average in reading and math. In 1976-77 the reading score percentile rank remained at 53, and the improvements in language and math achievement boosted the percentile rank to 51 for both areas.

Grade Twelve

The performance of California twelfth graders declined in 1976-77 to the extent that most of the ground that was gained in 1975-76 was lost. The performance of twelfth graders had declined sharply in 1974-75. Prior to 1974-75 the scores had been gradually but steadily declining (see Table 35). In 1969 the median California twelfth-grade student was scoring at the 52nd, 42nd, and 48th percentile ranks for reading, language, and math, respectively (on the basis of 1962 norms). In 1976-77 the median twelfth-grade student was at the 42nd, 33rd, and 43rd percentile ranks for reading, language, and math, respectively (on the basis of 1962 norms). California students continued to do most poorly in language skills.

Figure 19 shows the national percentile trends described above. The equating study that produced the Iowa Tests of Educational Development equivalents for the Survey of Basic Skills also compared the California results with two tests with more recent norms: the Tests of Academic Progress (1970 norms) and the Sequential Tests of Educational Progress, Series II, (1970 norms). The California students compared less favorably on these tests, although the pattern was the same: language achievement was lowest, and mathematics achievement was highest.

Table 33

National Percentile Ranks of Median California Pupil Performance
1965-66 through 1976-77
Grades Two and Three

Grade	Test Administered											
	Stanford Reading Test					Cooperative Primary Reading Test			Reading Test[a]	Reading Test[b] (Revised)		
	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Grade 2	28	30	32	36	38	50	53	53	53	54	54	55
Grade 3	NA[c]	34	34	36	36	38	52	52	52	55	55	56
Norms:	Stanford, 1963 Norms					CPRT, 1966 Norms				CTBS, 1973 Norms		

[a] The new California test, the Reading Test, was administered in 1973-74. The percentile ranks are based upon an equating of the Reading Test and the Cooperative Primary Reading Test, Forms 23A and 23B, normed in 1966.

[b] The revised Reading Test was administered to all California pupils in 1974-75, 1975-76, and 1976-77. The percentile ranks are based upon an equating study of the revised Reading Test and the Comprehensive Tests of Basic Skills, Form S, which was normed in 1973.

[c] Testing did not begin in grade three until 1967.

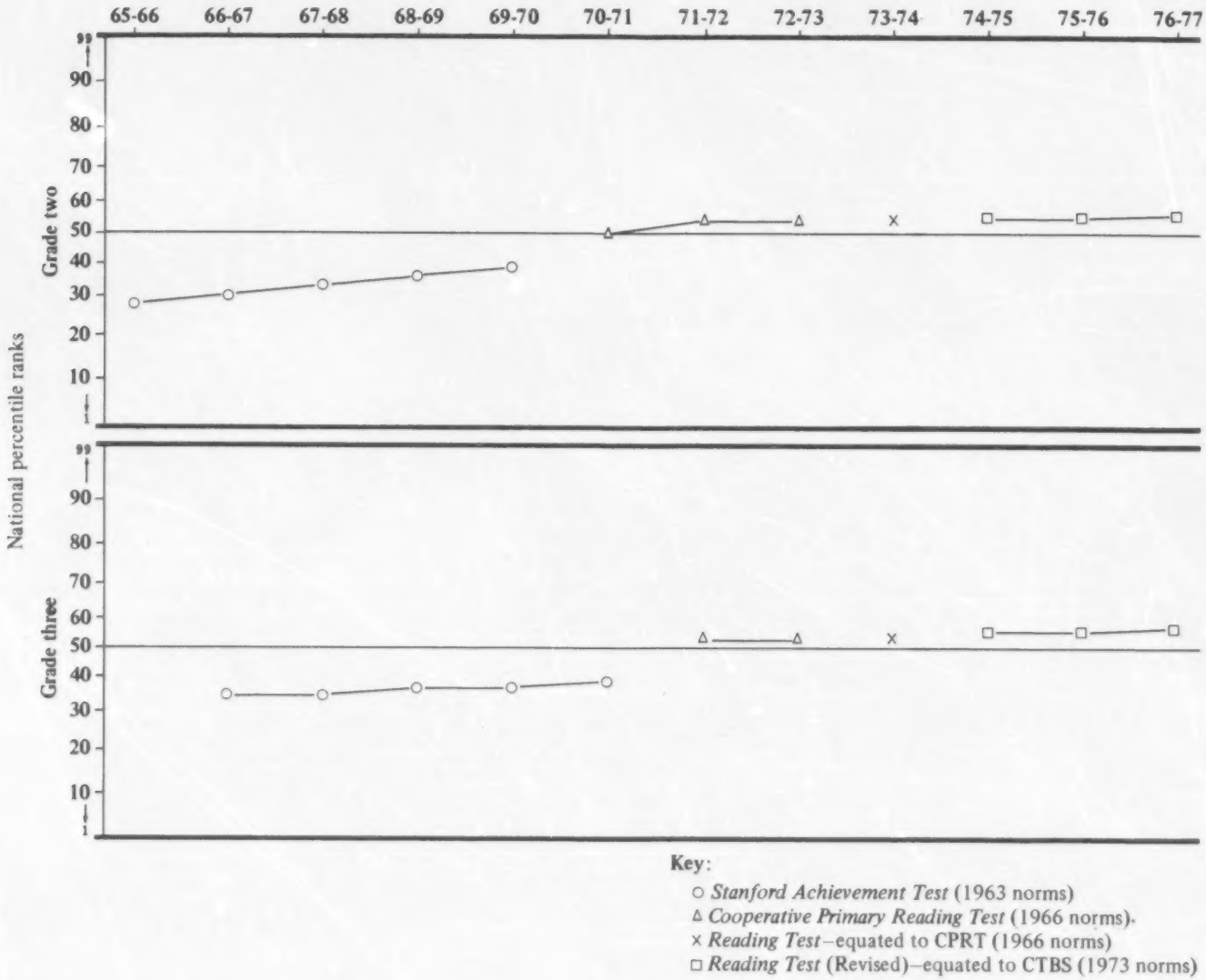


Fig. 17. National percentile ranks of median California pupil performance, 1965-66 through 1976-77, grades two and three

Table 34

National Percentile Ranks of Median California Student Performance
1969-70 through 1976-77
Grade Six

Content Area	Test Administered							
	Comprehensive Tests of Basic Skills					Survey of Basic Skills[a]	Survey of Basic Skills[b] (Revised)	
	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Reading	48	46	44	44	44	48	53	53
Language	43	43	39	39	37	43	49	51
Mathematics	47	43	38	38	38	44	50	51
Norms:	CTBS, 1968 Norms						CTBS, 1973 Norms	

[a] The new California test, the Survey of Basic Skills: Grade Six, was administered to all California pupils in 1974-75. The percentile ranks are based on an equating of the Survey of Basic Skills and the Comprehensive Tests of Basic Skills (CTBS), Form Q, which was normed in 1968.

[b] The revised version of the Survey of Basic Skills: Grade Six was administered in 1975-76 and 1976-77. The percentile ranks are based on an equating of the revised Survey of Basic Skills and the Comprehensive Tests of Basic Skills (CTBS), Form S, 1973 edition, the test for which the most recent norms were available.

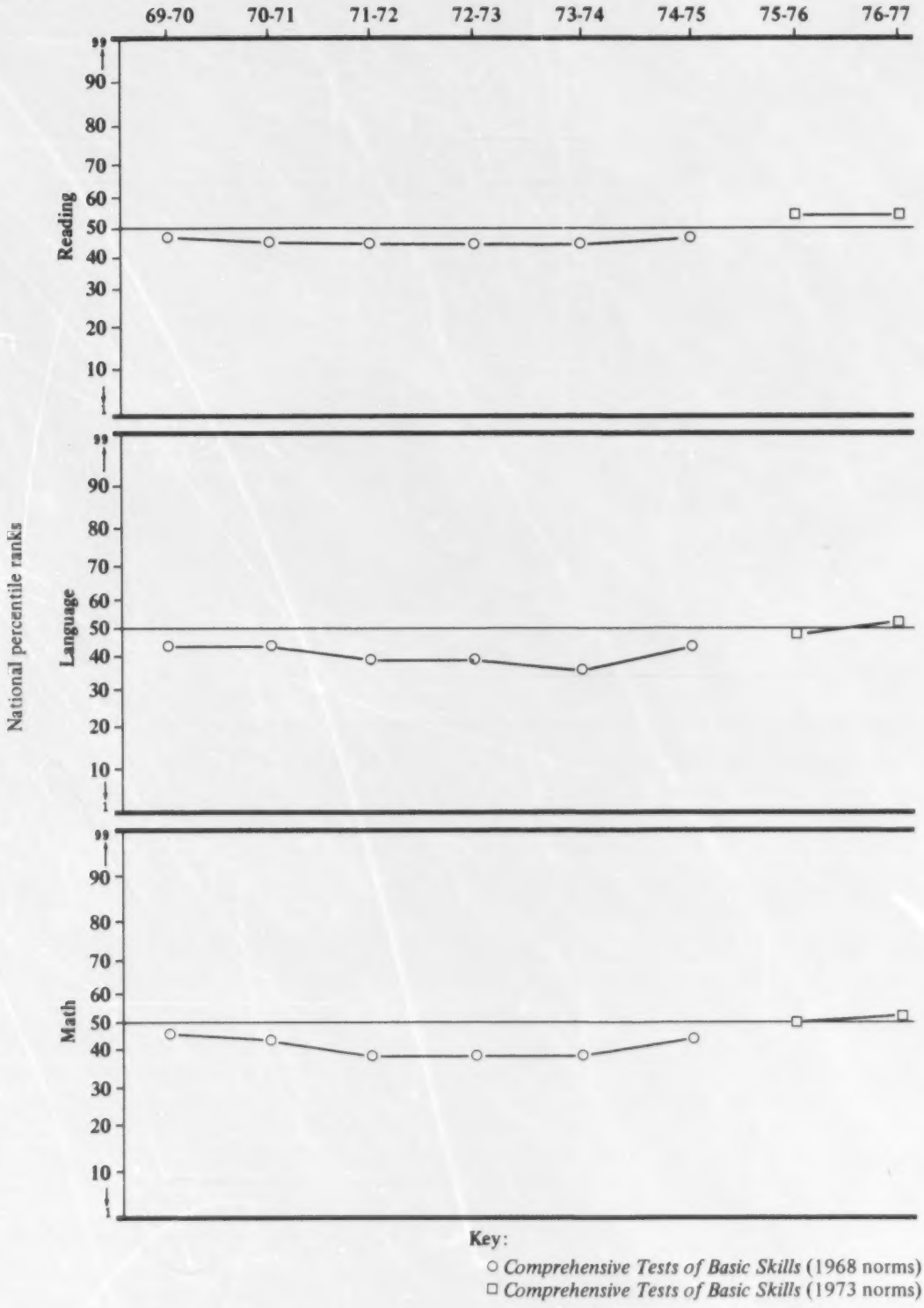


Fig. 18. National percentile ranks of median California pupil performance, 1969-70 through 1976-77, grade six

Table 35

National Percentile Ranks of Median California Student Performance
1969-70 through 1976-77
Grade Twelve

Content Area	Test Administered							
	Iowa Tests of Educational Development Form X, Normed in 1962					Survey of Basic Skills[a]	Survey of Basic Skills[a] (Revised)	
	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Reading								
ITED, 1962 Norms	52	49	49	47	47	41	43	42
TAP, 1970 Norms						33	35	33
STEP, 1970 Norms						34	38	36
Language								
ITED, 1962 Norms	42	40	38	36	34	32	34	33
TAP, 1970 Norms						25	27	26
STEP, 1970 Norms						27	29	28
Mathematics								
ITED, 1962 Norms	48	48	48	48	48	41	44	43
TAP, 1970 Norms						38	43	41
STEP, 1970 Norms						41	44	43

[a] The new California test, the Survey of Basic Skills: Grade Twelve was administered to all California students from 1974-75 through 1976-77. The percentile ranks are based on equating studies of the Survey of Basic Skills and three other tests with national norms: (1) Iowa Tests of Educational Development, Form X, Normed in 1962; (2) Tests of Academic Progress, normed in 1970; and (3) Sequential Tests of Educational Progress, Series II, normed in 1970.

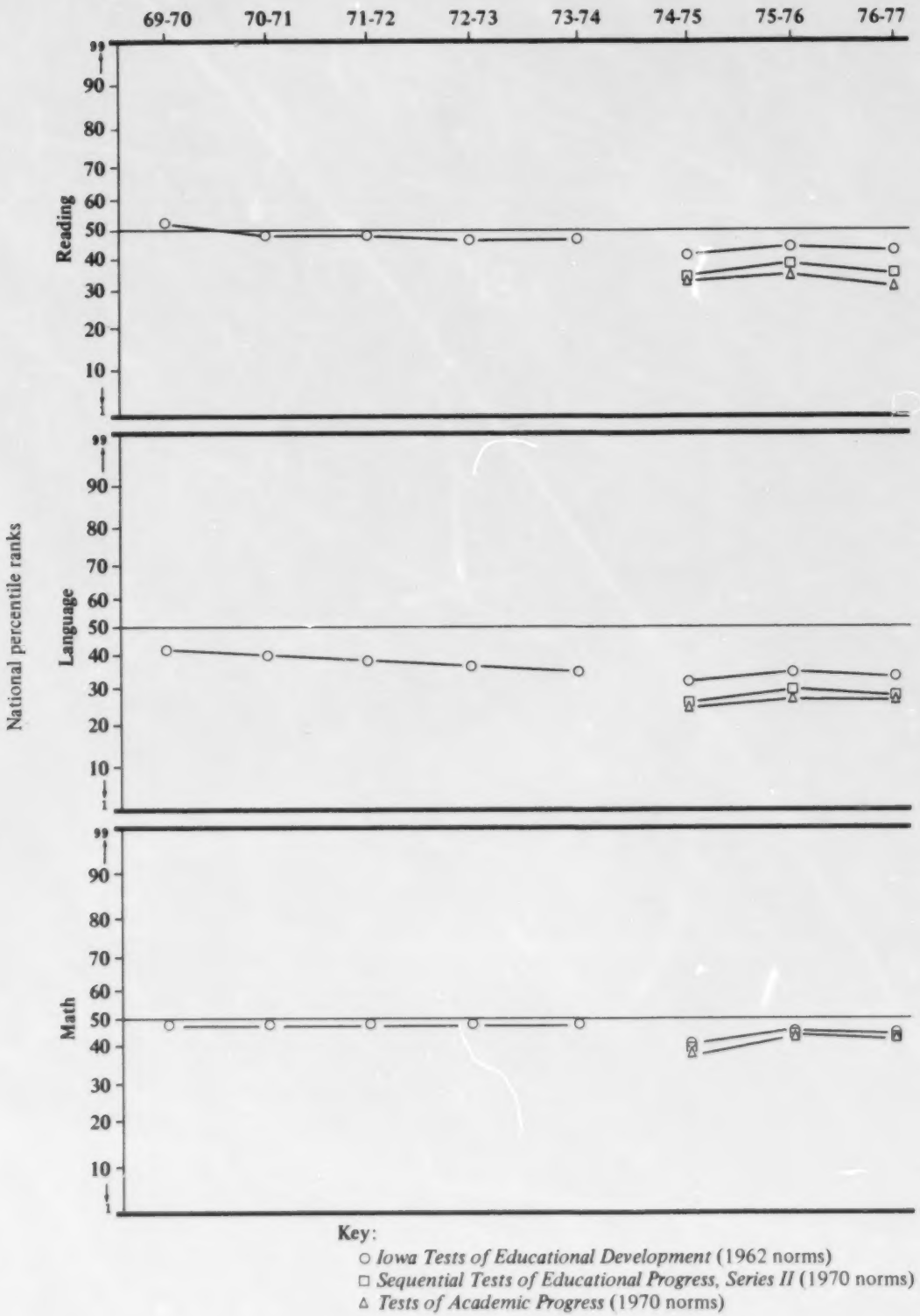


Fig. 19. National percentile ranks of median California pupil performance, 1969-70 through 1976-77, grade 12

Appendixes

APPENDIX A

Reading Performance, by Skill Area, of California Second- and Third-Grade Pupils, 1974-75, 1975-76, and 1976-77

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]						Illustrative test question[2]
			Grade two			Grade three			
			1974-5	1975-6	1976-7	1974-5	1975-6	1976-7	
TOTAL READING TEST		(250)	(67.6)	(67.7)	(68.4)	(81.3)	(81.4)	(81.7)	
I. WORD IDENTIFICATION	(Total and averages for word identification skill areas)	(60)	(75.4)	(75.5)	(76.2)	(85.8)	(85.6)	(85.9)	
A. Sight words	The pupil must choose the word that names the object which is pictured.	5	83.9	84.5	85.4	92.7	92.6	92.9	Teacher says: "Mark the word that goes best with the picture." o spool o spoon o stool
B. Phonetic analysis	(Total and averages for phonetic analysis skill area, a subcategory of word identification)	(45)	(76.5)	(76.5)	(77.1)	(86.1)	(85.9)	(86.2)	
1. Consonants	The pupil must choose the word that has a letter that is not sounded.	15	73.9	73.9	74.8	84.5	83.8	84.2	Teacher says: "Mark the word that has a letter that is not sounded." o right o lift o spent
2. Vowels	The pupil must choose the printed word that has the same vowel sound as the oral stimulus word.	20	80.3	80.3	81.0	87.8	88.1	88.2	Teacher says: "Mark the word that has the same vowel sound in its middle as the vowel sound in the word run." o cut o ran o fin
3. Spelling patterns	The pupil must choose the printed word that rhymes with the oral stimulus word.	10	72.9	72.7	72.8	84.9	84.9	85.1	Teacher says: "Mark the word that rhymes with the underlined word." show o blow o down o cow

[1] The only values presented in this column are averages. The percentages for individual items varied from the average value by 20 or more points.
[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]						Illustrative test question[2]
			Grade two			Grade three			
			1974-5	1975-6	1976-7	1974-5	1975-6	1976-7	
C. Structural analysis	The pupil must identify root words, suffixes, compound words, and contractions.	10	65.8	66.3	67.5	80.9	80.8	81.1	Teacher says: "Mark the combination of letters that is the correct division of the underlined word." firehouse o fi + rehouse o fire + house o fireh + ouse
II. VOCABULARY	(Total and averages for vocabulary skill areas)	(60)	(67.7)	(67.6)	(68.6)	(82.6)	(82.9)	(83.4)	
A. Denotation	The pupil must choose the response word that best fills the blank in the sentence.	22	68.8	68.9	69.6	84.0	83.6	84.6	Teacher says: "Mark the word that goes in the blank in the sentence." Father told Pat to ____ the back door. o leave o fast o close
B. Relational	(Total and averages for relational skill areas, a subcategory of vocabulary)	(38)	(67.0)	(66.8)	(68.0)	(81.8)	(82.5)	(82.7)	
1. Synonyms	The pupil must choose the response word that means the same as the underlined word in the phrase.	24	67.6	67.0	68.3	83.2	83.5	83.9	Teacher says: "Mark the word that means the same as the word that is underlined." a small dog o cute o little o happy o funny
2. Antonyms	The pupil must choose the response word that means the opposite of the printed stimulus word.	10	65.7	65.7	67.2	78.4	80.4	80.1	Teacher says: "Mark the word that means the opposite of the underlined word." light o evening o dark o bright
3. Homonyms	Although the format of this test item is the same as that used for denotation, the pupil must choose the response word from among three having the same sound.	4	66.5	67.2	68.6	82.4	81.5	81.9	Teacher says: "Mark the word that goes in the blank in the sentence." We have ____ dogs. o to o too o two

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]						Illustrative test question[2]
			Grade two			Grade three			
			1974-5	1975-6	1976-7	1974-5	1975-6	1976-7	
III. COMPREHENSION	(Total and averages for comprehension skill areas)	(110)	(61.3)	(61.3)	(62.4)	(77.0)	(76.7)	(77.1)	
A. Literal	Given a passage of printed material, the pupil must choose the correct response to a written question that requires identifying or remembering elements in the passage which were explicitly stated.	77	62.5	62.3	63.4	77.9	77.5	78.0	Dear Children, I hope that you are having a good time and working hard. I have missed the whole class very much. Miss Smith has been telling me that you have been very helpful to her. Thank you for all your cards and flowers. I have even had a few surprise visits from some of you! I hope to be back as your teacher soon. Until then, your get well cards made me think of you. Your teacher, Mrs. Black What have the children sent Mrs. Black? o cards and telephone calls o cards and flowers o flowers and clothes o food and clothes
B. Interpretive	Given a passage of printed material, the pupil must choose the correct response to a written question that requires using ideas and information, explicitly stated, to paraphrase, infer from, relate, or generalize from elements in the passage.	33	58.7	59.1	60.0	74.9	74.9	75.0	Where has Mrs. Black been? o on a trip o teaching in another class o sick o visiting out of town
IV. STUDY-LOCATIONAL SKILLS	(Total and averages for study-locational skill areas)	(20)	(75.5)	(77.2)	(77.9)	(88.0)	(88.0)	(88.8)	
A. Alphabetizing	The pupil must choose which letter or word comes first in alphabetical order.	10	73.8	75.5	76.3	87.8	87.3	87.9	Teacher says: "Mark the word that comes first in alphabetical (ABC) order." o dent o drive o dart o dog

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]						Illustrative test question[2]
			Grade two			Grade three			
			1974-5	1975-6	1976-7	1974-5	1975-6	1976-7	
B. Table of contents	Given a table of contents and a page number, the pupil must choose the story that begins on the given page.	10	77.3	79.0	79.6	88.2	88.8	89.7	Teacher says: "A page number is underlined. Look at the table of contents and then mark the title of the story that begins on the page that is underlined." TABLE OF CONTENTS The Happy Puppy . . . 6 John's Pet Frog . . . 12 The Little Horse . . 19 Moles . . . . . 28 The Lost Turtle . . . 32 Page 19 o The Happy Puppy o John's Pet Frog o The Little Horse o Moles

APPENDIX B

Reading Performance, by Skill Area, of California Sixth-Grade Pupils for 1975-76 and 1976-77

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
TOTAL READING TEST		(128)	(66.1)	(65.9)	(-0.2)	
I. WORD IDENTIFICATION	The pupil must identify correct pronunciation of words used in context, root words, the meaning of affixes, and contractions.	18	74.3	74.2	-0.1	The ending of the word tallest makes the word mean: o as tall as o less tall o taller than o most tall
II. VOCABULARY	The pupil must identify the meaning of a specific word in context.	25	67.1	66.3	-0.8	The boys made a hasty decision to go camping over the weekend. The word "hasty" as used here means: o hurried o wrong o thoughtful o hard
III. COMPREHENSION	Skills assessed in categories A and B.	(69)	(64.9)	(64.9)	(-0-)	
A. Literal	The pupil must identify or remember elements which have been explicitly stated. These elements include main ideas, details, and cause-and effect relationships.	39	67.4	67.2	-0.2	Travelers say our roads would be safer if we changed present road signs to picture symbols, or glymphs. With these picture signs it is not necessary for travelers to learn the language of a country to understand the directions. No words are used on the signs. Those who favor using glymphs in the United States admit that drivers would have to learn the picture symbols first. A glymph is a: o traveler o road o picture o word

[1] The values presented in this column are averages of the percents of questions answered correctly. The percentages for individual items may vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
B. Interpretive/Critical	The pupil must use ideas and information explicitly stated to infer from, relate, or generalize from elements in the materials read. These elements include main ideas, details, cause-and-effect, and author's purpose.	30	61.8	62.0	+0.2	Glymphs will probably help o prevent accidents o the blind o you learn to read o you learn other languages
IV. STUDY-LOCATIONAL	The pupil must identify which reference book to consult and be able to use parts of a book such as an index and table of contents.	16	60.0	59.8	-0.2	If you wanted to know the meaning of the word candid, the best book to use would be: o a dictionary o an encyclopedia o an atlas o the card catalog

APPENDIX C

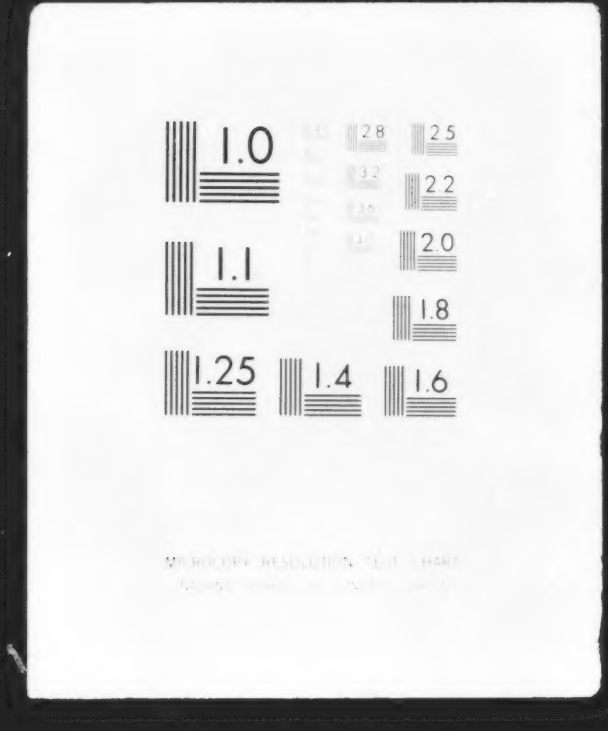
Reading Performance, by Skill Area, of California Twelfth-Grade Students for 1975-76 and 1976-77

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
TOTAL READING TEST		(141)	(64.1)	(63.6)	(-0.5)	
I. VOCABULARY	The student must identify the meaning of a specific word in context; given a definition, the student will select from a list the word most nearly opposite in meaning.	31	61.3	60.9	-0.4	The word "peers" in the last sentence means: o other congressmen o the voters o Speakers of the House o committee chairmen
II. COMPREHENSION	(Skills assessed in categories A and B)	(97)	(64.5)	(63.9)	(-0.6)	
A. Literal	From a paragraph or passage, the student must identify or remember elements which have been explicitly stated. These elements include main ideas, details, sequence, and cause-and-effect relationships.	47	69.2	68.9	-0.3	The current reform described in these paragraphs was begun by: o Republican Congressmen o Democratic Congressmen o "Uncle Joe" Cannon o Democratic Senators
B. Interpretive/Critical	From a paragraph or passage, the student must use ideas and information explicitly stated to paraphrase, infer from, relate, or generalize from elements. These elements include main ideas, details, cause-and-effect, and author's purpose.	50	60.1	59.3	-0.8	In the future, committee chairmen will probably o opt for a cleaner system. o have to be more responsible. o be selected by "Uncle Joe." o examine the effects of the earthquake.
III. STUDY-LOCATIONAL	The student must identify which reference book to consult and be able to use parts of a book, such as the index and table of contents.	13	68.4	67.2	-1.2	To discover last year's Gross National Product for the United States, you should consult: o a dictionary o a thesaurus o an almanac o an encyclopedia

[1] The values presented in this column are averages of the percents of questions answered correctly. The percentages for individual items may vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

2 BM


1.0
2.8
2.5
3.2
2.2
3.6
2.0
4.0
1.8
1.1
1.25
1.4
1.6

APPENDIX D

Written Expression and Spelling Performance, by Skill Area, of California Sixth-Grade Pupils for 1975-76 and 1976-77

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
TOTAL WRITTEN EXPRESSION TEST		(128)	(62.5)	(63.6)	(+1.1)	
I. WORD FORMS (see Morphology, Test Content Specifications)	The pupil must select the appropriate suffix (-ed, -ing, -s, -ly, -er, -est, 's) for a word in a given sentence.	16	82.4	82.3	-0.1	Fill in the oval next to the word that best fits each sentence. The children were still _____ in the pool. o play o plays o playing o had played
II. STANDARD USAGE	The pupil must select the verb or pronoun in a sentence which reflects standard English usage.	16	75.3	75.3	-0-	Fill in the oval next to the word that best fits each sentence. Leroy _____ the movie yesterday. o saw o seen
III. LANGUAGE CHOICES	The pupil must select the most vivid verb or specific noun for a given sentence.	26	54.4	56.5	+2.1	Pretend that you are writing a story. Fill in the oval next to the word that will give your reader the best picture of what's happening. The snake _____ across the grass. o moved o slithered o went
IV. SENTENCE RECOGNITION	The pupil must recognize complete sentences, fragments, run-ons, and normal English word order in sentences.	22	62.3	63.0	+0.7	Fill in the oval next to the group of words which needs more to make it a complete sentence. o They bought a house. o She is hungry. o Pedro is not there. o In the heat of the day.

[1] The values presented in this column are averages of the percents of questions answered correctly. The percentages for individual items may vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
V. SENTENCE MANIPULATION	The pupil must select the most effective sentence or sentence element.	16	61.7	62.6	+0.9	The following sentences say the same thing differently. Fill in the oval next to the best sentence. o My brother went and broke the new clock. o The new clock was broke by my brother. o The new clock was broken because of my brother. o My brother broke the new clock.
VI. CAPITALIZATION	The pupil must recognize words in a sentence which should be capitalized, such as the beginning word of a sentence, names of persons and places, days of the week, and months of the year.	14	57.4	58.4	+1.0	Fill in the oval next to the line with the mistake in capitalization. If there is no mistake, fill in the fourth oval. o In social studies we are o learning about many countries. o my favorite is Israel. o (No mistakes)
VII. PUNCTUATION	The pupil must identify errors in the use of the period, question mark, exclamation point, comma, apostrophe, and quotation marks.	18	52.4	52.5	+0.1	Look at the underlined portion to see if there is an error. If you find an error in punctuation, fill in the oval next to the letter of that error. If there is no error, the answer is D. "I dont (A) mean to refuse the doctor's (B) advice, but I still believe that sunshine is the best cure for a cold," (C) said Aunt Olive. No error. (D) o A o B o C o D
VIII. SPELLING		(64)	(63.6)	(63.6)	(-0-)	
A. Relationships	From a list of 3 or 4 words, the pupil must identify the incorrect spelling relationship for vowel and consonant sounds.	35	58.1	58.1	-0-	Fill in the oval next to the misspelled word in each group. If there is no misspelled word, the answer is "all correct." o steam o screem o sleeve o All correct

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
B. Word Forming	The pupil must select the correct spelling pattern used in a variety of common word formations.	29	70.2	70.3	+0.1	Pairs of words are given below. In each pair, one word is spelled incorrectly. Fill in the oval next to the correct spelling. o steped o stepped

APPENDIX E

Written Expression and Spelling Performance, by Skill Area, of California Twelfth-Grade Students for 1975-76 and 1976-77

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
TOTAL WRITTEN EXPRESSION TEST		(142)	(62.3)	(61.9)	(-0.4)	
I. WORD FORMS (see Morphology, Test Content Specifications)	The student must select the appropriate inflectional suffix (-ed, -ing, -s, -ly, -er, -est) for a given sentence, must discriminate between form class words (such as nouns and verbs) and structure words (such as prepositions), and must demonstrate dictionary skills for a variety of purposes.	24	72.6	72.1	-0.5	The dogs had ____ the long trek. o survival o survivors o surviving o survived
II. LANGUAGE CHOICES	The student must identify attitude-conveying words and phrases, must differentiate between specific and general sets of words, and must identify the audience of a prose passage.	32	66.9	66.7	-0.2	Which of the following is most specific? o plant o redwood o tree o living thing
III. SENTENCE RECOGNITION	The student must recognize complete sentences, sentence parts, sentence patterns, and appropriate subject-verb relationships.	20	67.3	67.7	+0.4	Identify the group of words which is incomplete or needs additional words to complete the meaning. o Mack and Sonny skipped school. o The rising clouds of dust. o The day was hot and clear. o Twelve o'clock is lunchtime.
IV. SENTENCE MANIPULATION	The student must select the most economical, effective sentence and must be able to recognize effective coordination and subordination within sentences.	12	42.9	42.9	-0-	Mark the sentence below which expresses the thought most EFFECTIVELY and ECONOMICALLY. o He spoke to me in a very warm manner when we met each other Tuesday. o When we met Tuesday, I was spoken to in a very warm manner by him. o His manner was very warm when meeting and speaking to me Tuesday. o Tuesday he greeted me warmly.

[1] The values presented in this column are averages of the percents of questions answered correctly. The percentages for individual items may vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
V. PARAGRAPHS	The student must identify irrelevant material in a paragraph, recognize inconsistent time development, select the logical sequence of a group of sentences, select the sentence which best summarizes the ideas presented in one or more related parapraphs, and identify transitional elements within a paragraph.	26	59.9	59.1	-0.8	Which of the following phrases is used to indicate a connection between the two (given) paragraphs? o Could not know o Even so o They lead o They shape
VI. CAPITALIZATION AND PUNCTUATION	The student must recognize capitalization and/or punctuation errors in sentences.	28	54.6	54.3	-0.3	Identify any capitalization or punctuation errors in the underlined parts of the following sentence. The Hills, (A) who have just returned from lake (B) Tahoe, are already planning next winter's (C) trip. No error. (D) o A o B o C o D
VII. SPELLING	The student must decide if an underlined word in a given sentence is spelled correctly.	72	68.0	66.8	-1.2	Fill in the oval next to "right" if the word is spelled correctly or next to "wrong" if the word is spelled incorrectly. Carmen steped on my toes. o right o wrong

APPENDIX F

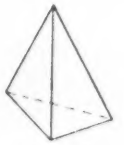
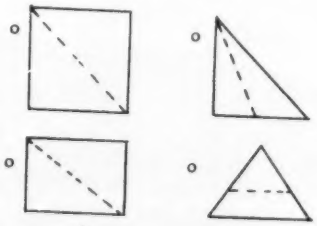
Mathematics Performance, by Skill Area, of California Sixth-Grade Pupils for 1975-76 and 1976-77

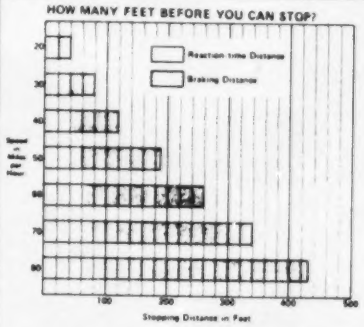
Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
TOTAL MATHEMATICS TEST		(160)	(57.4)	(57.7)	(+0.3)	
I. ARITHMETIC	(Skills assessed in categories A, B, C, and D in I. Arithmetic)	(96)	(61.0)	(61.0)	(-0-)	
A. Number concepts	(Skills assessed in categories 1, 2, and 3 in A. Number concepts)	(28)	(65.4)	(65.5)	(+0.1)	
1. Number and numeration	The pupil must identify whole numbers, fractions, and decimals; identify place value; and recognize points on a number line.	13	75.0	75.6	+0.6	What digit is in the tens' place in 4,263? o 2 o 3 o 4 o 6 o None of these
2. Number theory	The pupil must recognize odd, even, prime, and composite numbers and choose the lowest common multiple or greatest common factor of several numbers.	9	56.1	56.1	-0-	What is the greatest common divisor of 8, 12, and 16? o 4 o 8 o 12 o 16
3. Number properties	The pupil must recognize commutative, associative, and distributive properties of operations on numbers.	6	58.6	57.8	-0.8	Name the missing number. 6 x 15 = □ x 6 o 9 o 15 o 90 o 540 o None of these

[1] The values presented in this column are averages of the percents of questions answered correctly. The percentages for individual items may vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
B. Whole numbers	(Skills assessed in categories 1 and 2 in B. Whole numbers)	(28)	(66.9)	(67.5)	(+0.6)	
1. Computation	The pupil must perform addition, subtraction, multiplication, and division involving whole numbers.	16	77.4	77.9	+0.5	6003 -209 o 6,794 o 5,894 o 5,804 o 5,794
2. Application	The pupil must apply the four arithmetic operations on whole numbers, solving problems presented in a daily life context.	12	52.9	53.6	+0.7	Joe packs tomatoes 4 to a box. If he has packed 18 tomatoes, which box is he now packing? o the fourth o the fifth o the sixth o the eighteenth
C. Fractions	(Skills assessed in categories 1 and 2 in C. Fractions)	(20)	(49.6)	(49.0)	(-0.6)	
1. Computation	The pupil must perform addition, subtraction, multiplication, and division involving fractional numbers.	13	50.5	49.8	-0.7	4 × 4/7 = o 1 2/7 o 2 2/7 o 4 4/7 o 7
2. Application	The pupil must use the four arithmetic operations on fractions, mixed numbers, and fractions to demonstrate comprehension or ability to solve problems in a daily life context.	7	48.0	47.5	-0.5	Jack's spelling test had 60 words. h spelled 3/4 of the words correctly. How many words did Jack misspell? o 80 o 45 o 15 o 4
D. Decimals	(Skills assessed in categories 1 and 2 in D. Decimals)	(20)	(56.3)	(57.8)	(+1.5)	
1. Computation	The pupil must perform addition, subtraction, multiplication, and division involving decimal numbers.	12	56.6	58.9	+2.3	62.1 - 41.4 = o 10.7 o 20.7 o 21.7 o 57.06 o None of these

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
2. Application	The pupil must use the four arithmetic operations on numbers in decimal form to demonstrate understanding of principles and ability to solve problems in a daily life context.	8	55.8	56.2	+0.4	The Wards' total expenses during the 8 days at the ranch were $491.60. What was the average cost per day? o $61.45 o $61.32 o $60.20 o None of these
II. GEOMETRY	(Skills assessed in categories A and B in II. Geometry)	(20)	(58.8)	(58.5)	(-0.3)	
A. Knowledge of facts	The pupil must be able to identify basic geometric figures.	8	68.7	68.4	-0.3	 This figure is called a: o pyramid o prism o cylinder o cone
B. Application	The pupil must be able to comprehend and apply basic geometric knowledge and concepts.	12	52.2	51.9	-0.3	Which of the following figures is divided by a line of symetry? 
III. MEASUREMENT AND GRAPHS	(Skills assessed in categories A and B in III. Measurement and graphs)	(32)	(52.1)	(53.5)	(+1.4)	
A. Knowledge of facts	The pupil must be able to estimate length and volume; convert length, mass, volume, and time from one unit to another unit; perform arithmetic operations on quantities of length, mass, volume, and time.	14	44.8	47.2	+2.4	3 yards 1 foot = o 4 feet o 7 feet o 10 feet o 13 feet

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
B. Application	The pupil must be able to solve problems related to measurement of length, area, mass, and volume.	18	57.8	58.4	+0.6	 Use the above graph to find the top safe speed for stopping within a maximum distance of 140 feet. o 30 miles per hour o 40 miles per hour o 50 miles per hour o 120 miles per hour
IV. PROBABILITY AND STATISTICS	(Skills assessed in categories A and B in IV. Probability and Statistics)	(12)	(40.4)	(40.9)	(+0.5)	
A. Computation	The pupil must be able to compute probability of simple events and compute the mean, mode, and median of a set of given numbers.	6	42.4	42.3	-0.1	If an event is certain to occur, then the probability of that event is: o 1/2 o 1 o 100 o zero
B. Application	The pupil must be able to solve problems related to elementary concepts in probability and statistics.	6	38.5	39.6	+1.1	A bowl contains one white marble, two red marbles, and three blue marbles. If you were blindfolded and then removed one marble from the bowl, what is the probability that the marble you removed would be red? o zero o 1/3 o 1/2 o 2/3 o None of these

APPENDIX G

Mathematics Performance, by Skill Area, of California Twelfth-Grade Students for 1975-76 and 1976-77

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
TOTAL MATHEMATICS TEST		(198)	(67.0)	(66.3)	(-0.7)	
I. ARITHMETIC	(Skills assessed in categories A, B, C, and D in I. Arithmetic.)	(98)	(72.9)	(72.1)	(-0.8)	
A. Number concepts	(Skills assessed in categories 1, 2, and 3 in A. Number concepts.)	(28)	(74.3)	(73.5)	(-0.8)	
1. Number and numeration	The student must identify whole numbers, fractions, and decimals; identify place value; and recognize points on a number line.	14	71.0	70.1	-0.9	In which numeral is the digit 7 in the tens' place? o 976.3 o 97.63 o 9.763 o 0.9763
2. Number theory	The student must recognize odd, even, prime, and composite numbers and choose the lowest common multiple or greatest common factor of several numbers.	8	76.2	75.9	-0.3	If n is an odd number, what can you say about n + 1? o It is always odd. o It is always even. o It is even or odd depending upon what n is. o None of these
3. Number properties	The student must recognize commutative, associative, and distributive properties of operations on numbers.	6	79.6	78.5	-1.1	☐ X 7 = (4 X 7) + (5 X 7) What number goes in the ☐ above? o 2 o 8 o 9 o 20
B. Whole numbers	(Skills assessed in categories 1 and 2 in B. Whole numbers.)	(22)	(80.1)	(80.1)	(-0-)	

[1] The values presented in this column are averages of the percents of questions answered correctly. The percentages for individual items vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
1. Computation	The student must perform addition, subtraction, multiplication, and division involving whole numbers	14	80.9	81.0	+0.1	504 -99 o 405 o 415 o 495 o 505
2. Application	The student must apply the four arithmetic operations on whole numbers in solving problems presented in a daily life context.	8	78.7	78.5	-0.2	A parking lot has 25 rows with 18 spaces for cars in each row. If 3 rows are removed for a driveway, what is the greatest number of cars which can be parked on the lot? o 375 o 396 o 414 o 447 o None of these
C. Fractions	(Skills assessed in categories 1 and 2 in C. Fractions.)	(26)	(66.0)	(64.5)	(-1.5)	
1. Computation	The student must perform addition, subtraction, multiplication, and division involving fractional numbers.	14	70.4	68.3	-2.1	4 x 4/7 = o 1 2/7 o 2 2/7 o 4 1/7 o 7
2. Application	The student must use the four arithmetic operations on fractions, mixed fractions, or whole numbers and fractions to demonstrate comprehension or ability to solve problems in daily life context.	12	60.9	60.0	-0.9	Jack's spelling test has 60 words. He spelled 3/4 of the words correctly. How many words did Jack misspell? o 80 o 45 o 15 o 4
D. Decimals	(Skills assessed in categories 1 and 2 in D. Decimals.)	(22)	(71.8)	(71.2)	(-0.6)	
1. Computation	The student must perform addition, subtraction, multiplication, and division involving decimal numbers.	14	74.1	73.8	-0.3	786.4 - 34.87 = o 4.377 o 43.77 o 751.53 o 7,515.3

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
1. Computation	The student must perform addition, subtraction, multiplication, and division involving whole numbers.	14	80.9	81.0	+0.1	504 - 99 o 405 o 415 o 495 o 505
2. Application	The student must apply the four arithmetic operations on whole numbers in solving problems presented in a daily life context.	8	78.7	78.5	-0.2	A parking lot has 25 rows with 18 spaces for cars in each row. If 3 rows are removed for a driveway, what is the greatest number of cars which can be parked on the lot? o 375 o 396 o 414 o 447 o None of these
C. Fractions	(Skills assessed in categories 1 and 2 in C. Fractions.)	(26)	(66.0)	(64.5)	(-1.5)	
1. Computation	The student must perform addition, subtraction, multiplication and division involving fractional numbers.	14	70.4	68.3	-2.1	4 X 4/7 = o 1 2/7 o 2 2/7 o 4 1/7 o 7
2. Application	The student must use the four arithmetic operations on fractions, mixed fractions, or whole numbers and fractions to demonstrate comprehension or ability to solve problems in daily life context.	12	60.9	60.0	-0.9	Jack's spelling test has 60 words. He spelled 3/4 of the words correctly. How many words did Jack misspell?
D. Decimals	(Skills assessed in categories 1 and 2 in D. Decimals.)	(22)	(71.8)	(71.2)	(-0.6)	
1. Computation	The student must perform addition, subtraction, multiplication, and division involving decimal numbers.	14	74.1	73.8	-0.3	786.4 - 34.87 = o 4.377 o 43.77 o 751.53 o 7,515.3

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
2. Application	The student must use the four arithmetic operations on numbers in decimal form to demonstrate understanding of principles and ability to solve problems in daily life context.	8	67.8	66.6	-1.2	If Beth can drive 18.7 miles on each gallon of gas, how many miles can she drive on 7 gallons? o 126.9 o 130.9 o 140.9 o 1309 o None of these
II. ALGEBRA	(Skills assessed in categories A and B in II. Algebra.)	(32)	(62.9)	(62.1)	(-0.8)	
A. Computation	The student must be able to perform addition, subtraction, multiplication, and division of algebraic variables and identify a point shown on rectangular coordinates.	14	66.4	65.9	-0.5	If $7x - 38 = 18$, then $x =$ o -8 o -5 o zero o 5 o 8
B. Application	The student must be able to construct an algebraic equation to solve a given problem and be able to interpret tables, charts, and graphs.	18	60.1	59.2	-0.9	The following formula can often be used to approximate the weight for boys between the ages of 1 to 7: $\underline{W} = 8 + 2 \cdot 2\ \underline{A}$ where $\underline{W}$ is the weight in kilograms and $\underline{A}$ is the boy's age in years. The formula tells that for each year older that a boy becomes, he should weigh: o 8 kilograms more o 8 kilograms less o 2.2 kilograms more o 2.2 kilograms less
III. GEOMETRY	(Skills assessed in categories A and B in III. Geometry.)	(24)	(62.7)	(62.1)	(-0.6)	
A. Knowledge of facts	The student must be able to identify basic geometric sets and figures.	12	75.2	75.5	+0.3	 Which of the points are in the interior of angle RST? o P only o V only o V and W o R, S, and T

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
B. Application	The student must be able to comprehend and apply basic geometric knowledge and concepts.	12	50.1	48.7	-1.4	In the plane of a circle with radius 5.04 inches, if a point P lies 5.4 inches from the center of the circle, then P lies: o on the circle o at the center of the circle o outside the circle o inside the circle but not at the center
IV. MEASUREMENT	(Skills assessed in categories A and B in IV. Measurement.)	(30)	(60.5)	(59.5)	(-1.0)	
A. Knowledge of facts	The student must be able to estimate length and volume; convert length, mass, volume, and time from one unit to another unit; and perform arithmetic operations on quantities of length, mass, volume, and time.	12	71.6	70.5	-1.1	10 decimetres = 1 metre 1000 millimetres = 1 metre The length of a piece of chalk is 0.5 decimetre. What is its length in millimetres? o 0.05 o 5 o 50 o 500
B. Application	The student must be able to solve problems related to measurement of length, area, mass, and volume.	18	53.1	52.2	-0.9	A housewife will pay the lowest price per ounce for rice if she buys it at the store which offers: o 12 ounces for 40 cents o 14 ounces for 45 cents o 1 pound, 12 ounces for 85 cents o 2 pounds for 99 cents o None of these
V. PROBABILITY AND STATISTICS	(Skills assessed in categories A and B in V. Probability and Statistics.)	(14)	(57.2)	(56.9)	(-0.3)	
A. Computation	The student must be able to compute the probability of simple events and compute the mean, mode, and median of a set of given numbers.	6	57.9	57.6	-0.3	Tom, Dick, and Harry lined up to enter their classroom. What is the probability that Tom was the first one in line? o zero o 1/3 o 2/3 o 1 o None of these

Skill area	Description of skills assessed	No. of Items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-6	1976-7	Change	
B. Application	The student must be able to solve problems related to elementary concepts in probability and statistics.	8	56.6	56.3	-0.3	Three of four boys each weighs 60 pounds. What is the weight of the fourth boy if the average of the weights of all four boys is 70 pounds? o 130 pounds o 100 pounds o 80 pounds o 65 pounds

APPENDIX H

A Description of Equating Procedures Used in the California Assessment Program

Grade Three

School-level frequency distributions of the total reading score from the Spring, 1977 administration of the Comprehensive Tests of Basic Skills, Form S, Level 1, were obtained from 11 districts: Fountain Valley, Fullerton, Santee, Pomona, Compton, South San Francisco, Redwood City, Salina City, Ukiah, Berkeley, and Ceres. For each school, the number of students tested on the CTBS and the number tested on the Reading Test, Spring, 1977 administration, were compared. When the difference in the number of pupils tested exceeded 10 percent, the school was eliminated. Nineteen schools were eliminated for that reason. They were replaced by 19 schools from San Jose Unified. The total final sample included 138 schools, with 8,699 pupils tested on the CTBS, and 8,589 tested on the Reading Test, after scores of non-English speaking pupils had been eliminated.

The frequency distribution for the 8,699 CTBS scores was totalled. The scores of the 8,589 pupils tested on the Reading Test were used to estimate what the mean and variance of total test scores would have been had all students taken the full 250-item Reading Test. The obtained mean and variance were used to estimate what the distribution of scores would have been had all students taken the total test by assuming that those total test scores would have distributed themselves as a negative hypergeometric distribution.

The two frequency distributions--the actual obtained one for the CTBS, and the estimated one for the Reading Test--were used to develop an equipercentile equating line. This is done by taking any point in one distribution, computing the percent of scores lying below that point in the distribution, and then finding the point in the second distribution that has that same percent of scores lying below it.

The distributions of scores that would have occurred had all pupils in California taken the full 250-item Reading Test, rather than a 25 item sample were estimated for grades two and three. At both grades, this was done by first computing the estimated total-test variance from a 2 percent systematic sample of all pupils tested. Again assuming that scores statewide followed a negative hypergeometric distribution, the sample variance and population mean then were used to estimate the statewide distribution of scores.

From these two distributions, it was estimated that if all pupils in the state had taken the full 250-item Reading Test in 1977, the median score for grade two would have been 182.0, and for grade three, 221.0. From the equating line, these scores equated to CTBS total reading scores of 33 and 53, respectively. A total reading score of 33 on the CTBS at the second grade is the 55th percentile; a score of 53 at the third grade is the 56th percentile.

Grade Six

Equating for grade six was done in a manner very similar to that for grade three. District-level frequency distributions for the total reading, total language, and total mathematics scores from the Spring, 1977 administration of the Comprehensive Tests of Basic Skills, Form S, Level 2, were obtained from seven districts: South San Francisco, Turlock, Santee, San Jose, Ukiah, Ceres, and Fountain Valley. These seven districts were chosen because they had administered the CTBS to their entire sixth grade population. This was verified against the number tested on the Survey of Basic Skills: Grade 6. The total sample included 6,876, 6,830, and 6,845 students tested on the CTBS in reading, language, and math, respectively, and 6,753 students tested on the SBS.

Equipercentile equating lines were developed for all three areas using the same procedures developed for grade three. The statewide variance was estimated from a one-thirtieth systematic sample of the state. Then, the statewide median was estimated, by content area, for the total SBS by assuming scores followed a negative hypergeometric distribution with the population mean and estimated population variance. The estimated median scores on the SBS were 88.3 (out of 128 items) for reading, 84.1 (out of 128 items) for written expression, and 93.5 (out of 160 items) for mathematics. These equated to CTBS raw scores of 63, 79, and 74 for total reading, total language, and total mathematics, respectively. The corresponding publisher percentile ranks of these scores were 53, 51, and 51.

Grade Twelve

Prior to 1974-75, California twelfth-grade students had been tested with the Iowa Tests of Educational Development. In January of 1975, the new state-developed test, Survey of Basic Skills: Grade 12, was introduced. In spring, 1975, a special study was conducted to estimate what the statewide performance of California twelfth-grade students would be if they had taken one of the three standardized tests in January, 1975: Iowa Tests of Educational Development (ITED), Sequential Tests of Educational Progress (STEP Series II), and the Tests of Academic Progress (TAP). Using the estimated performance on the publishers' tests and the data from the administration of the new state-developed tests, estimates of California student performances in comparison to national norms were also obtained for 1975-76 and 1976-77.

Estimation of National Norm Comparisons for 1974-75. Data from the following samples of students were used for estimating the performance of the state's median student on selected standardized tests: (1) A 10 percent random sample of 25,000 students drawn from the entire state population of twelfth-graders, with scores on the Survey of Basic Skills: Grade 12, and (2) A stratified random sample of 105 schools with about 30,000 grade-twelve students. All grade-twelve students in each of the schools in the stratified sample were administered one part (content area) of the following standardized tests in the spring of 1975: ITED Reading, Language, or Mathematics; STEP Series II, Reading, English Expression, or Mathematics; TAP Reading, Composition, or Mathematics. The data on these students were also available from the January, 1975 statewide administration of the grade-twelve Survey. By matching students within a school on the basis of their birthday and sex, the data from the standardized tests were paired with that of the Survey. Approximately 15,000 students comprised the matched sample.

The procedure for estimating the performance of the median California student as compared to publishers' norms included the following steps.

1. Linear Equating of the Survey Forms. The total number of items in the Survey were spread over 18 forms in a stratified random sampling fashion. Each form had an approximately equal number of items in the three content areas: reading, written expression, and mathematics. Since items were not exactly equal in each form and since the difficulty value of the item cluster within each content area varied from form to form a linear equating procedure was used to convert the raw scores to a common scale scores. For each content area the raw scores on 17 forms were equated to the scale score of the chosen form. The transformation equation took the following form.

$$Y = aX + b$$

$$\text{where,} \quad a = \frac{SD_Y}{SD_X} \qquad \text{and} \quad b = \bar{Y} - a\bar{X}.$$

2. Estimation of Median Student Performance. The performance of the state's twelfth-grade median student on each of the nine standardized tests (three tests by three content areas) was estimated by means of a frequency estimation procedure[1]. The purpose of the frequency estimation procedure was to estimate a marginal frequency distribution for each standardized test, given only to a smaller group, using the bivariate distribution of the standardized test with the Survey given to the same small group, and the univariate distribution of the Survey given to a larger group. The marginal frequency distribution of the standardized test gave the estimated distribution that would have resulted if all California twelfth-graders had taken the standardized test. The raw score corresponding to the median of the estimated distribution represented the performance of the median student on the standardized test. The estimated raw score was then converted to the percentile ranking corresponding to the publisher's norm sample. The statewide performance on the three standardized tests in the three content areas--reading, written expression, and mathematics--are given in Table 35.

Estimation of National Norm Comparisons for 1975-76. The student performance in 1975-76 on publisher's test was estimated by assuming that the z-score change from 1974-75 to 1975-76 on the standardized test would be equal to the observed z-score change during the same two years on the Survey. Furthermore, it was assumed that the performance on the typical California twelfth-grade student was represented by the mean statistic both on the standardized test and on the Survey. In particular, the following equation was used to calculate the performance of the twelfth-grade students in 1975-76 on the standardized test in raw score unit:

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[1] For details of frequency estimation procedure, see Bianchini, J.C., "Estimation of California Statewide Performance on Selected Standardized Tests at Grades 6 and 12," ETS, Berkeley, California, 1975.

$$Y' = Y + \frac{SD_Y}{SD_X}(X' - X)$$

where,

Y' = Estimated raw score on the standardized test in 1975-76
Y = Mean raw score on the standardized test in the year 1974-75

X' = Mean Survey score on common items in 1975-76
X = Mean Survey score on common items in 1974-75
SD_Y = Standard deviation of the student scores reported by the publisher
SD_X = Estimated standard deviation of the student scores on the Survey

The standard deviation of the student scores on the Survey was estimated using the following relationship.

$$\frac{\text{Standard deviation of the district scores on the Survey}}{\text{Standard deviation of the student scores on the Survey}} = \frac{\text{Standard deviation of the district scores on the ITED}}{\text{Standard deviation of the student scores on the ITED}}$$

The standard deviations of the student and district scores on ITED were available from the statewide testing program data for 1973-74. The standard deviation of the district scores on the Survey was calculated from the data available from the 1975-76 administration of the Survey.

The percentile rank corresponding to the estimated mean on the standardized test, Y', was obtained using the test publisher's norm table. The percentile ranks were linearly interpolated from the norm table, if necessary, to find the percentile ranking corresponding to a fractional raw score. Table 35 provides the estimated performance of California twelfth-grade students for 1975-76.

Estimation of National Norm Comparison for 1976-77. The estimation procedure for 1976-77 was the same as the procedure for 1975-76 except that in the 1976-77 estimation, the values of X and X' were based upon all item data because the tests for the two years were exactly the same. Table 35 provides the estimated performance of California twelfth-grade students for 1976-77.